Presented to

Mr. Henry Wilson

with Dr. & Mrs. Lees Respects.

Hartwell: 2 December. 1851.

Captain William Henry Smyth. R.N.

ÆDES HARTWELLIANÆ,

OR

NOTICES OF THE MANOR AND MANSION OF

HARTWELL.

BY

CAPTAIN W. H. SMYTH, R.N.
K.S.F., D.C.L., F.R.S., &c.

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MDCCCLI.

INTRODUCTORY LETTER.

London, 1st *of September*, 1851.

My dear Lee,

Few people will be more surprised than yourself, on opening these pages, at the miscellany here compounded. It is true you were informed that my object was to indite an account of the Hartwell Observatory; but it became impossible to draw that up without vivid recollections of a mansion in which the writer has passed so many—and he hopes useful—hours, and of an estate to which he has been so many years a trustee, under Act of Parliament. For obvious reasons this intention was not revealed to you; but the tenor of my inquiries, with the rummaging of old musty deeds, and the ransacking of all sorts of papers, might have betrayed that a favourite object was under treatment. Through all, the voluntary task is now worked out, and I submit the result to your judgment.

You will find, it is trusted, though your documents have been pretty freely acted with, that I have strictly steered the course which lies between public or general interest and personal confidence; and that in no instance has the line of propriety been violated, or even strained beyond a proper latitude.

With the exception of your own two lithographs of Egyptian stelæ, the plates of this work are engraven from drawings expressly made by members of my family; who, having all, at various times, enjoyed the hospitalities of Hartwell House, were much interested in my undertaking. Thus the night-scene in the Transit-room, the appearance of Encke's comet, the colossal statues of Bubastis, and the Egyptian pronaos, are by my second son, Charles Piazzi, the Astronomer-Royal for Scotland: the reduction of the mansion and grounds from an old painting, the Equatorial-room, the Oxford Heliometer, and several

of the smaller embellishments, are by Mrs. Smyth: the morning and evening views of the house are from the pencil of my youngest son, Henry Augustus, now a Captain in the Royal Artillery: the ancient north front of the house, the Muniment-room, Pompey's Pillar, and some other pieces, are by my daughter, Ellen Philadelphia: the rebus-vignette on the title-page was imagined and drawn by my son-in-law, the Rev. Professor Baden Powell, of Oxford: and the Map of the Vicinity was reduced by myself from the Ordnance Survey, with local additions and corrections, together with the new survey of the Homestead, plan and sections of the Observatory, and some of the wood-cut illustrations. Thus, you will perceive, it is a "family piece" which I now present, with assurances of remaining

Yours very truly,

W. H. Smyth:—

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ILLUSTRATIONS.

LEE, of HARTWELL HOUSE COUNTY of BUCKS

Created 16th August 1660

1 — Sir Thomas Lee, created as above, married Anne daughter & heiress of Sir John Davis of Pangbourn, Knt and died February 1690

2. — Sir Thomas. son & heir, married Alice daughter & heiress of Thomas Hopkins of London, Merchant.

3 — Sir Thomas son & heir, married Elizabeth daughter & heiress of Thomas Sandys Esqre., and died December 1749

4 — Sir William, heir married Elizabeth, daughter of Simon Earl Harcourt and died 6 July 1799

5 — Sir William, son & heir Colonel 25th dragoons d. s. p. at Madras 7 February 1801.

6 — Revd. Sir George, brother & heir rector of Water Stratford county of Bucks, & died unmarried in 1827 when the Title became Extinct.

MAP
Shewing
THE SITUATION OF HARTWELL IN
BUCKINGHAMSHIRE.
and its Meridian Line.

J. Basire sculp.

ÆDES HARTWELLIANÆ.

CHAPTER I.

DETAILS RESPECTING THE PARISH AND MANOR OF HARTWELL: LOCALITY, GEOLOGY, PRODUCE, AND GENERAL STATISTICS.

§ 1. CHOROGRAPHICAL SITUATION.

NEARLY in the centre of the inland county of Buckingham, and forty miles to the north-west of London, stands the ancient borough-town of Aylesbury; a place of great consideration, some rights of which are still held by a singular tenure of William the Norman, which enjoins the lord of the manor to provide straw for the king's bed and chamber on royal visits; "I hope," says Camden, "the nice part of the world will observe this." Besides the litter, the said lord was also bound to furnish his majesty with three eels whenever he should come in winter; and in summer he was to furnish sweet herbs with the straw, and two green geese *(Aylesbury ducks?)* for the royal table. The name of the town is imparted to a large and fertile vale, which extends along the northern flanks of the Chiltern Hills, from the borders of Hertfordshire—in what Aubrey's MS. terms, an "eastish and westish direction"—into the limits of Oxfordshire. The royal antiquary, Leland, gives extravagantly capacious boundaries to it in his Itinerary, saying, "This vale goeth one waye to the forrest beyond Tame Markett. It goeth otherwayes to Buckingham, to Stonye Stratford, to Newport Painell, and alonge from Alesbury by the rootes of the Chilterne Hilles almost to Dunstable." Mostly formed of a rich black loam on a calcareous subsoil, its teeming fruitfulness has been acknowledged for ages. Nearly two hundred and fifty years

ago, it was thus described by old Michael Drayton, in the XVth song of his elaborate topographical work the Poly-olbion:—the "rich and goodly" district being therein represented under a personification, as a party to the marriage of the rivers Thame and Isis:—

"For Aylsbury's a vale that walloweth in her wealth,
And (by her wholesome air continually in health)
Is lusty, firm, and fat, and holds her youthful strength.
Besides her fruitful earth, her mighty breadth and length,
Doth Chiltern fitly match; which, mountainously high,
And being very long, so likewise she doth lie
From the Bedfordian fields, where first she doth begin
To fashion like a vale, to th' place where Thame doth win
His Isis' wished bed; her soil throughout so sure,
For goodness of her glebe, and for her pasture pure,
That as her grain and grass, so she her sheep doth breed,
For burthen and for bone all other that exceed."

But before the poet thus chaunted the vale of Aylesbury in numbers, the learned Camden had already celebrated its fertility in set Latin; and a passage selected from the Bishop of Lincoln's translation runs—"The vale is almost all champain, the soil is chalky, stiff, and fruitful. The rich meadows feed an incredible number of sheep, whose soft and fine *(tenuissima)* fleeces are sought after, even from Asia itself. In this most fruitful vale, one (lately) entire pasture called Beryfield, (part of the inheritance of Sir Robert Lee, Baronet,) in the manor of Quarendon, lets yearly for eight hundred pounds; and the lordship of Crestow is no less remarkable, which, consisting not of above five hundred acres, hath yielded a rent of eight hundred pounds a-year and upwards." The Berry Fields are about two miles and a quarter north of Hartwell House; and the land before alluded to was situated between Fleet Marston and Quarendon.

In the northern portion of this celebrated vale, and at about one mile to the west of the town of Aylesbury, on the high road to Oxford, commences the parish of Hartwell; lying directly opposite the fine chain of hills called the Chilterns, the Crown-hundreds of which are so noted in parliamentary fiction. The name of this manor, as usual, has given rise to inquiry and discussion. Some

consider it to have been derived from *herde-welle*, a spring for flocks to drink at; while others insist that it comes from *hart* and *well.* The latter is highly possible, for even the county itself, instead of being named, as is popularly asserted, from the abundance of its beech trees, is more likely to have deduced its designation from the British *bwch,* Saxon *buc* * or *bucca (cervus)*; "it being very probable," says Camden, "that those woody parts abounded with deer." At all events, a rebus-seal of the hart and well appears on some of the old documents of the muniment-room of Hartwell House, which is strongly indicative of the then prevailing opinion. Thus an early parchment roll entitled "The rentall of Mycaell Hampden for the halfe yeres rente of his manor," is ratified with six waxen seals, which were carefully wrapt in tree-leaves, some of which I opened, and found one with a deer drinking at a well on it: and immediately above the ferret fastenings is written—"In wytnes herof this Rentall ys trew the pties whos names herafter doth follow have sette theire handes and sealles the xxij. daye of Marche in the yeare of our Lorde God MDLXVIJ."

Upon another small but boldly-written parchment, in Latin, wherein the same Michael Hampden grants land to William Flameborow, 21st August, 1570 (12th Elizabeth), this seal is attached, where, on the back of the animal, the erased peacock's head appears, that being the crest of the Hampdens of Hartwell: and this may have been the cause, that so many of those gorgeous creatures have immemorially been cherished in the vicinity of the mansion.

On mentioning these particulars to my friend, Sir Charles Young, *Garter*, he produced a variation of the same rebus, which he found on a Visitation Record of the date 1613; but he has no doubt of its being of a still earlier origin. The following is from the drawing which he kindly sent me;

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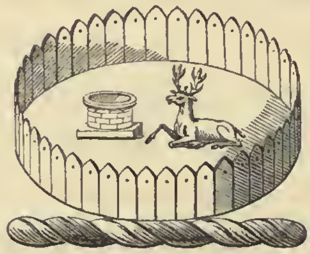
* By accepting this derivation, the sarcasm of Charles V. becomes pointed and racy. When this emperor heard that the Duke of Buckingham was beheaded by Henry VIII. at the instigation of Cardinal Wolsey, whose Ipswich origin was well known, he observed that "the *butcher's dog* had run down the finest *buck* in England."

and its blazon would be—In a park *vert,* palisaded *or,* a hart lodged and a well *arg.,* the wreath *or* and *gu.*



§ 2. ARCHÆOLOGY.

Although it must have been a station of that tribe of Britons named Cattieuchlani, and in the centre of the district called *Flavia Cæsariensis* after the Roman subjugation, the manor of Hartwell has yielded but few relics of high antiquity, or fragmental evidences of former times. It is conveniently placed between the Akeman and Ikening Streets, the latter of which is still called the Acknal Way by the country people—whose local etymology thus becomes "speaking antiquity," as it were; and traces of a *madan* or maiden-path, the name for an ancient British military road, run from the one towards the other, under the usual designation of Portway. It is traceable in a line south of Hartwell, being commonly called by the synonym, Ford Lane,—from the Celtic or British *Fford,* a road,—in the portion from thence to Cold Aston and the south of Stone station. Arriving at the Calley, it crosses the Oxford Turnpike road close to the Bugle Inn, and, turning by Bittenham—Anglo-Saxon *Byght-hám,* a corner bend—passes over the archway bridge of the Hartwell grounds into Lynch Lane, whence it continues across the fields and meads in a north-easterly direction to a spot distinguished by that curious but very frequent name—Cold Harbour; communicating also with another spot bearing the equally common designation of Cold Comfort.*

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* I made a communication to the Society of Antiquaries on the subject of "Cold Harbours," which is printed in the 33rd vol. of the Archæologia. Since that paper was read, the Rev. William Airy, Vicar of Keysoe, has

Several skeletons of men and horses, with two or three corroded third-brass coins of the Lower Empire, one of Mezentius, were found in 1842, when lowering the high road near Stone: and a large Byzantine bronze fibula had been found by a labourer in an adjacent spot, in 1840. In Eythorpe fields, near Stone, there are two conical mounds, nearly touching at their foot, which appear to be artificial; but in the spring of 1849, at my request, Dr. Lee excavated the one which stands on his own ground. It is about thirty feet high, and of two hundred feet radius at its base. The trenches were opened with an animation worthy of success: but antiquarian expectation was doomed to disappointment, for the geological details gave indisputable evidence of its being a natural deposition, like the strata of the district, from which the outer masses had been swept off by the floods which scooped the valley below. A very accurate record of the cutting was taken by the Rev. J. B. Reade, the excellent and intelligent Vicar of Stone, and the following tabulated depths of the section may be deemed an illustrative abstract:—

	ft.	in.	
I.	1	7	Vegetable mould.
II.	0	5	Shelly oolite, containing ammonites, trigoniæ, &c.
III.	0	7	Sandy loam.
IV.	0	2	A bed of green sandstone pebbles.
V.	0	9	Yellow clay.
VI.	5	0	Greyish yellow clay.
VII.	0	2	A well-defined and undisturbed green line, indicating an ancient surface.
VIII.	3	9	Dark grey clay.
IX.	0	4	Band of iron-stone.
X.	9	10	Light grey clay.
XI.	0	8	Kimmeridge clay.

But, although few artificial vestigia can be directly traced to the British or Roman occupants of this immediate neighbourhood, there are numerous inferential evidences of its early importance. All, however, is rather inferential than positive, as respects the immediate vicinity of Hartwell; for Camden, speaking nearly three centuries ago of Æȝleſbuɲȝh, deplores that its old British

obligingly sent me a list of other places so called in the vicinity of Roman roads in Bedfordshire, Suffolk, and Huntingdonshire. Among these, he calls my attention to "Serpentine Green," about one mile north of Yaxley, saying—"The last will amuse you; but it looked so like a translation of your origin of the name *(Coluber)*, that I could not refrain from setting it down." There is a noted Cold Harbour under Ashridge, where the old Roman way joined the Ikeneld Street near Tring.

name, "through the injury of time," was quite lost. When the Romans had over-run and subjugated the island, the Vale of Aylesbury was included in the before-mentioned Flavia Cæsariensis: and we may conclude that the inhabitants, being given to agriculture and the arts of peace, did not require the establishment of camps and garrisons to keep them in check; hence the paucity of archæological relics of that day. The nearest Roman station to Hartwell, of any importance, seems to have been the well-chosen one at Whitchurch.

In the summer of this year (1850), traces of extensive Anglo-Romano sepulture were discovered in opening the foundations for a County Lunatic Asylum, about a couple of furlongs west of the village of Stone. The principal feature consisted of two pit-shafts containing funeral pottery, similar to those in Surrey, which were recently described by Dr. Diamond. Though the urns were of the homeliest order, typical of a lowly people, the "find" was locally interesting. The disinterment was superintended by the Rev. G. B. Reade; and Mr. J. Y. Akerman, the zealous and persevering Archæologist, is about to describe the relics to the Society of Antiquaries.

After the memorable departure of the Romans from Britain, the vale became for a long period the theatre of battles and revolutions among the Britons, the Saxons, and the Danes; and the remarkable White-leaf Cross cut on the face of an opposite hill, the name of Bledlow-ridge, and other local marks, still bear testimony to the sanguinary bearing of those distressing struggles, although Milton might loftily brand them as only comparable with the skirmishes of kites and crows. The political importance of the numerous competitors, on all sides, may be questionable enough: yet those dreadful ravages which occasioned the burning of towns and villages, and spared neither age, sex, nor condition, constituted too calamitous a period to be passed only with a sneer! At length, in or about the year 571, Aylesbury was one of the four British garrisons taken by the Saxons under Cuthwulf, in the expedition which he made to Bedford; and the district was incorporated as a part of Mercia, to whose monarchs it became subject during the continuance of that kingdom. But of those times, although traces may be caught in other parts of the county, the space around Hartwell is singularly

barren of substantial evidence; nor does the traditionary lore of the village extend its glance into remote antiquity. Such a country, in such a situation, must have been well peopled, and studded with fanes and edifices; but all has passed, doubtless into better hands, and the very ruins of a former day have perished!

§ 3. HARTWELL PARISH.

Formerly the commons, common fields, and wastes in this county, bore a very large proportion to the whole of its area; but between the years 1702 and 1797 there were no fewer than thirty-one Inclosure Acts passed by the Parliament, comprehending thirty-eight thousand four hundred and fifty-seven acres,—besides twenty-two Acts in which the number of acres is not specified. The district of Hartwell had long been open and woody; at length however it was inclosed by an Act of Parliament passed in 1776. In this year there were one thousand seven hundred and forty acres inclosed in Stone and Hartwell parishes; the effect of which was, that meat and butter considerably increased, but wheat diminished in the ratio of nearly four bushels per acre. Among other arrangements made on that occasion, an allotment of land was assigned to the rector in lieu of tithes; yet it seems that the respective adjustments were not conducted without effervescence, and their consequent irregularity is still felt. The Rev. Richard Smith was the Rector of Hartwell and Vicar of Stone; and, among some remarks to an estate survey made in 1777, I find the following, in the autograph of Sir William Lee: "He (the reverend gentleman) was offered to have one entire allotment for all his rights in both parishes that by Act of Parliament were to be compensated in land, to be laid together in one farm adjoining to the vicarage of Stone, with farm-house, barn, &c., but from an unaccountable obstinacy he insisted on having the several detached pieces scattered about in the map, without any accommodation."

Being ecclesiastically connected with the chapelry of Little Hampden *(Hartwell cum Hampden-Parva)*, a small vill among the woods on the opposite side of the vale, the statistical returns of Hartwell parish have, since the reign of Henry III., usually included both that hamlet and the smaller one of Sedrup. In the beginning of the last century, Hartwell contained seventeen families, consisting of sixty persons; the average number of births annually being three, and of burials two. In 1813, there were the mansion, the rectory, four farm-houses, and thirteen cottages tithe-free: and the population, which, in 1730, was found to be seventy-six, now amounted to one hundred and twenty-four. The augmentation has been steadily progressive; for, in 1841, the inhabitants numbered seventy males and sixty-eight females; and in 1850 there were one hundred and forty-six men, women, and children; while the cottages had increased to twenty-four. Among these, there is the good fortune to reckon but two or three paupers, so that while their neighbours of Stone were paying four shillings in the pound for poor's rates, Hartwell averaged only one shilling and eight pence. Hence a general appearance of substantial comfort, and consequent peaceable habits: the cottages are neat, with good gardens and out-houses, and every convenience for the proper accommodation of the tenants,—points of importance which have been specially looked to by the present lord of the manor, Dr. Lee. The poorer inhabitants of the village are considerately attended to and assisted by an institution established in 1814, under the name of "The Stone and Hartwell Benevolent Society:" by supplying them with fuel and clothing, small sums of money in sickness and distress, and by providing the use of child-bed linen and other necessaries for poor married women. A donation of 10*l.*, and a subscription of 6*l.* per annum, by the late Sir George Lee, was augmented with the interest of 100*l.* by Louis XVIII. King of France. The latter is said to have been the proceeds of the sale of plate and furniture used at Hartwell House, during his Majesty's residence there.

Such are the local charities of Hartwell and Stone,—but it must be recollected that they are also situated in the hundred and union of Aylesbury. They have, however, generally rowed together with mutual advantage, being too

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intermixed to admit of separate interests. In this spirit, a covenant between the parishes was formally agreed on, at a general meeting of the inhabitants in January, 1791, under the guidance of Sir William Lee. It was instituted for promoting the "detection and impeachment of offenders, and securing the blessings of public justice," in consequence of some unexpected felonies and outrages having been committed in that vicinity. The preamble stated, that the union was for the purpose of creating an establishment of mutual aid, "for preventing, by every legal effort, the commission of those enormities for the future, inasmuch as the delinquents, by eluding discovery, have hitherto escaped the vengeance of the law, and might otherwise (from the ineffectual endeavours of an injured individual) be disposed to continue their atrocious practices, and perpetrate crimes of a more alarming degree of guilt." Many of the rules and observances of this well-adapted body, remind me of the useful corps of Barancelli, an armed association for the protection of the rural departments in the island of Sardinia.

But the school of the district must not be forgotten—since, by teaching the young idea to work, as well as to shoot, it is found to be well adapted for its end. It was instituted under the patronage of Sir George Lee about the year 1820, and has continued with a steady progress to the present hour. The school-house is a detached building situated nearly equi-distant from the villages of Hartwell and Stone, and also from the hamlet of Bishopstone. One acre of land has been annexed to it by Dr. Lee, which is divided off by a quick-set hedge from the adjoining field. The average number of boys attending the school throughout the year is about thirty, each paying two pence per week to the master. Besides the usual time devoted to approaching the Parnassian heights, the boys are occasionally employed one hour each day, from 1 to 2 P.M., on the one-acre allotment, and for their labour they receive a penny each; they work willingly, and in case of misdemeanour would be deprived of the garden-privilege. The produce of this juvenile husbandry is sold, and the proceeds realised thereby pay the rent of the land, wages to the boys, a gratuity to the master, the expenses of tools, seeds, manure, &c.; whilst a small balance—some 3*l.* or 4*l.*—is

usually left in hand, which is placed in the savings' bank as a reserve fund. The gross annual average amount realised for the produce of this acre of land, during the last seven years, is 13*l.* 4*s.*; but in 1839 it amounted to 18*l.* 13*s.* 7*d.* Dr. Lee would accommodate them with more land were it required; but the due cultivation of one acre seems fully equal to their present force.

Few bodies can exist in emulation without guerdons of honour, and their consequent *panem et circenses.* So, in the teeming month of August in each year, the boys of this school, and the girls of the Stone and Hartwell Sunday-schools, altogether about sixty in number, assemble at Hartwell House. Here twelve of the girls, and four of the boys, selected according to merit, are presented to Dr. and Mrs. Lee, and receive a suit of new clothes on the occasion, under an appropriate address from the doctor or the ministers of the parishes. The whole of the pupils are then regaled with a hearty dinner of beef, mutton, and plum-pudding, after which they disport themselves in the grounds of the mansion for a couple of hours, when they are re-assembled in the great hall. When order has obtained, the schoolmaster produces his accounts for the preceding year, with a list of his scholars, shewing the number of hours they have each worked in the garden during the year, and the arrears of payment due to them. These sums are then formally given by Mrs. Lee to each boy, with suitable remarks, accompanied with the present of a little book, proportioned to the age and progress of the scholar: and she also awards books to the girls; after which a hymn is sung, and they are dismissed to their homes.

§ 4. THE RECTORY.

Hartwell Rectory is in the rural deanery of Wendover. In the Valor Eccles. made for the assessment given by Pope Nicholas IV. to Edward I. in aid of his crusade, it was taxed at 8*l.*; and thus it continued till the survey made in the 26th Hen. VIII., when it was valued at 14*l.* 15*s.* 10*d.*, since which it has stood

in the King's Book at 14*l.* 5*s.* 5*d.*, though the actual returns of the living may now be valued at 230*l.* per annum.* The advowson of the church had belonged to the manor for a period of nearly six hundred years; but the present patron, Dr. Lee, having some strongly-grounded scruples as to the propriety of church-preferment being in private and irresponsible hands, presented it to the Royal Astronomical Society of London in 1838—he having previously given that of Stone to the same learned body. The church, dedicated to the Assumption of the Blessed Virgin, which stood here when the Lees acquired the estate, appears to have been a very ordinary building; and it must have been erected long after that charged twelve marks in the *Taxatio Valor* made in 1291. The structure is minutely described by Browne Willis, in the MSS. preserved in the Bodleian Library, in whose time the rectory—worth 100*l.* per annum—was held by Alexander Crooke. This church, which had apparently been erected about the time of Richard III. and had undergone a thorough repair in 1660, is stated by him to consist "of a body and north isle and chancel, which are tiled. At the west end is a broad wooden turret, in which hangs one modern bell cast out of the two little ones which formerly hung there. On the south side is a small tiled building, in which are the seats of the family of Lee. Length of the church and chancel, twenty-three yards; breadth of the church and north isle, eight yards. No arms or painted glass in the windows, except in the east window a broken effigies, which seems to be of the Virgin Mary." Among the monumental memorials then existing in this church, he mentions—"On the pavement at the lower end of the chancel, a very ancient marble, thereon on a brass an heart, and underneath on a plate this inscription—'Here lyeth the harte of Richard Hampden, Esq. then Chiefe Clerk of the Kychen unto the Queen's Majestie, whos body is buryed in gret Kymbel Churche. Obijt 30 May, 1567.'"

The present elegant church was erected by Sir William Lee, the fourth baronet, who was warmly aided therein by his uncles; Sir William, the Chief

* In 1803, the parish-rates, at 3*s.* produced 169*l.* 18*s.* 6*d.* In 1843, the annual value of real property, as assessed to the Property and Income Tax, was 1763*l.* 3*s.*

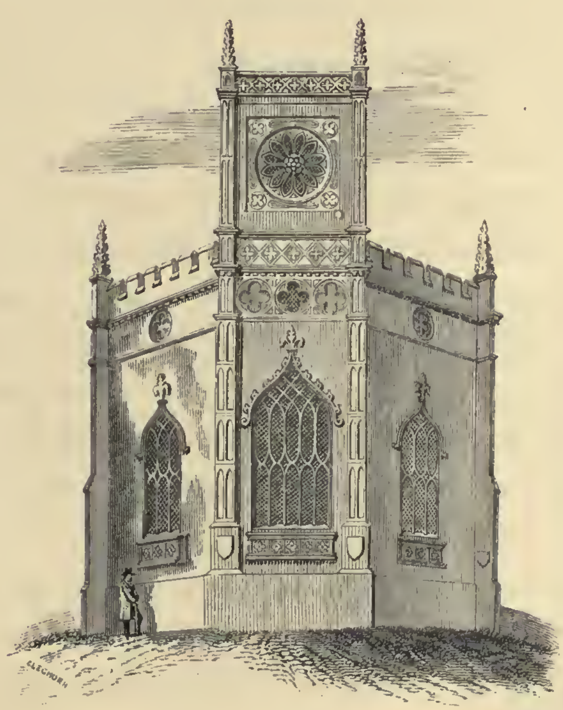
Justice, contributing 1000*l.*, to which sum his brother, Sir George Lee, added 500*l.* It is constructed in the florid Gothic style, on the model of the well-known Chapter-house at York Minster; the peculiarity of which consists in there being no central pillar to support its elaborately-groined roof; and the pressure upon the walls is effectually counteracted by an appropriate buttress to each external angle. It was completed in 1756, having been only two years in hand; and the situation is extremely well adapted for harmonizing effect with convenience, as well for the parish as the mansion, the rectory, and the grounds.

This edifice is built of the finest freestone, and evidently with the best appliances of masonic art. It is in shape an octagon, the interior diagonals of which are fifty feet seven inches across, by sixty-four feet in height; having two square towers, eighty-eight feet high, one at its east and the other at its west end, extending the inner length in that line to seventy-two feet five inches. These towers, being symmetrically built, surmounted with crocketed pinnacles nine feet high at the angles, and a neat parapet pierced with quatre-foil featherings, add greatly to the beauty of the exterior aspect of the fabric, while increasing the stability of the whole: from the uses to which they are appropriated, one is named the Belfry Tower, and the other the Communion Tower. There are three doors, of which the principal is on the west side; over each is an ornamental blind rose, or wheel-window, and the other faces of the octagon are each decorated with a well-proportioned Gothic window, above which are quatre-foiled clerestory apertures. On the exterior these windows are decorated at their apex with a *fleur-de-lys*, and on the interior with a flory-form ornament of nearly the same description: this, coupled with the circumstance of that symbol being also on the ancient porch of the mansion, was made matter of remark when the royal family of France resided at Hartwell. Over the principal entrance is a gallery which forms the pew of the Lees, and at the back of it are the arms of England on a shield of stone; while on the window opposite, over the Communion-table, are the Lee bearings and crest. In the intersections of the upper mullions, are the shields of Hampden, Lee, and Harcourt; and above them is a royal crown surmounting

a coat. The interior of the edifice has a very striking air of taste and neatness, from its general form and airy aspect, heightened by the finely-finished pendant of the fan-tracery roof, the lozenged black and white marble pavement, the open-carved frames of the pulpit and reading-desk, and the regular rows of well-made moveable benches, on its otherwise unincumbered area.

Under the church is a cryptic vault, of equal dimensions with the periphery of the foundation walls: this space is roofed with groined arches springing from solid pillars of stone erected on the area-ground, and forms three large recesses containing nine catacombs, wherein repose the ashes of the Hampdens, the Ingoldsbys, and the Lees. The parish burial-ground is on the north side of the rectory-lands, and, as is recorded on a stone obelisk in its centre, was "consecrated y^e^ 29th May, Anno Dom. 1756:" it is kept in excellent order, and the communication between it and the church is easy and convenient.

To this slight description, the following sketch—copied from a drawing by Lady Elizabeth Lee—of the church as seen from the east, may prove illustrative.



§ 5. CLIMATURE.

Hartwell proper has an area amounting to six hundred and seventy acres, of which two hundred and eighty are laid out in pasture land, one hundred and sixty in arable, twenty in wood land, and the rest in meadow: but the whole manorial estate, extending into Stone parish and the hamlet of Bishopstone—so named from being the site of Bishop Odo's share of the winning—comprehends nearly two thousand six hundred acres, the whole of which may be considered as included in the following observations:

Although placed on an undulating plain, the estate is elevated about five hundred feet above the level of the sea; and the situation is airy and open without bleakness. It is bounded on the north by the meanders of the river Thame, one of the most considerable tributaries of the thrice-noble Thames; on the east by Aylesbury parish and Walton lordship; on the west by Morton and Upton lordships; and on the south by Bishopstone brook. A small spring rising near Wendover, enters Hartwell on the east, and runs to the north-west, where it joins the brook which separates this parish from that of Aylesbury. The locality is therefore on the whole well watered, and, during the winter season, is consequently not exempt from the maladies fostered by cold and humidity. But though catarrhs, rheumatism, and remittents may be looked for, the local influence in their production and modification is not exerted to any extraordinary degree; and by no means so much so as among the surrounding hills. The situation must, for this reason, be pronounced healthy; and, although there are times and seasons in which ailments are more general than at others, the diseases are mostly of a simple character.

This condition as to salubrity, though not entirely dependent on the local meteorology, is no doubt largely influenced by it; for, though we can readily account for the atmospheric variations of density, electricity, and temperature,

there may yet be many chemical affinities with which we are at present utterly unacquainted. Particular soils radiate the heat in greater or less abundance, and ranges of hills—such as those of the Chilterns, Winchendon, Pitchcot, Weedon, and Wing, which surround Hartwell—will modify the condensation of atmospherical vapour: but the effects ascribable to such causes, can as yet only be estimated by a patient study of the phenomena which they produce. The various consequences of a particular temperature on local situation, as relative to agriculture and comfort, are sufficiently obvious, although from inattention we are less sensitive of weather affections than other animals; but it must be confessed that experience has anticipated theory, and intelligent diligence has still to detect the art which nature uses, to direct and govern the physical forces and complicated alternations of meteorology.

The general bearing of the local climate is pretty well shown in records of the weather which Dr. Lee has had regularly kept, since 1829 to the present time; from which, and from many observations I have been enabled to make in numerous visits during each of the elapsed years, some tolerable conclusions may be drawn. My remarks, however, will principally relate to a group of ten years; for the highly improved system of register introduced lately by Mr. Glaisher, of the Greenwich Royal Observatory, will no doubt form a future discussion of the Hartwell meteorology. From the data already collected, it is seen that the usual annual extremes of weather take place in January and July; but that certain conditions of wind, and other atmospheric phenomena, occasion interruptions, so that the greatest cold may occur in a range between December and March. The prevalent winds are from W.S.W. to S.S.W., and the E.N.E. wind is the coldest in spring. The most intense heat happens during settled weather and south-easterly winds, in the summer, the maximum of the thermometer occurring between 1 and 2 P.M., and the minimum just before sunrise; and, though, of course, there are frequent anomalies under atmospheric vicissitudes, the following summary is a passable average for the local seasons of this district:

JANUARY.—Usually cold and frosty, with the thermometer near its

minimum, under very small variation. In the milder winters there are strong gales, with rain, from S.W. to N.W. The mean pressure of the atmosphere is 30·20 inches, and range of the barometer 1·49 inch. The sky during this month is frequently clear and bright, but the vegetable kingdom remains in its winter quarters, protected from the rigour of the season.

February.—Generally gloomy and chilly, yet the mean temperature on the rise. The prevailing winds are from S. to W., followed by thaws and rain, but with occasional sharp gales from N.W. and N. The mean range of the barometer is 1·42 inch, and that of the thermometer about 25°. The trees still retain the appearance of lifeless skeletons, and the aspect of nature is dreary, although a few heralds of spring are observable.

March.—This is a very fickle month, humidity and warmth in attendance on each other, and occasional bright days are followed by sleet, dry winds, and hard gales, especially about the time of the vernal equinox. The barometer ranges 1·24 inch, and the thermometer about 30°. The buds of the trees and shrubs are now swelling, and the meadows wear a livelier green, in token of renewed life.

April.—Though it has bright and balmy days, this is often a cold month, with ungenial frost at times. The barometer is pretty steady, with an average range of 1·15 inch, and the mean temperature rising; but there is great vicissitude in the weather at this, the season for blossoms and leafing.

May.—This month generally completes the verdure of the fields, and all vegetation is in rapid progress; still there are parching winds from the N.E. quarter, with chilly nights. The energy of the solar beams strengthens, the atmosphere attains great dryness, the thermometer rises, and the mean variations of the barometer do not exceed 1·01 inch.

June.—The foliage and verdure are now in full development; and the summer quarter opens with fine seasonable weather, though there is occasionally thunder and rain. Twilight continues all night, and the dews fall heavily: much against observing clusters of stars and nebulæ. The thermometer now indicates a great increase of temperature—usually between 75° and 80°—and

the mean range of the barometer is only 0·89 inch. At or about mid-summer, the hay-harvest is in hand here; and the trees are in their richest clothing.

July.—As the high temperature continues, the weather is warm and fine, and the summer is now perfect. The winds are variable, but generally hang in the S.W. quarter, with frequent rain and occasional thunder and lightning. Though the summer solstice has impinged on the direct influence of the sun, yet the earth and air have been so acted on that the solar rays attain a maximum of energy in this month, and the barometer has its minimum range, it being only 0·81 inch. While the mowed grounds exhibit their emerald green surfaces, the sober hues of maturity overspread the wheat and barley fields, and the corn is fit for the sickle by St. James's Day.

August.—In weather details the "rich array'd" August continues very like July, being generally fine and genial, with occasional storms of wind, thunder, and rain. Under the full influence of the solar rays, the temperature remains warm, with a high maximum of barometer, the which only varies 0·98 inch of the column. By the middle of this month, the harvest is secured and carried by good practical farmers, even whether the season is marked by backwardness or not.

September.—With the commencement of autumn, a falling temperature is perceptible; and, though the weather is generally fine, it is stormy at times, with thunder, especially at or about the equinox—less so, however, than during the March passage. The mean pressure of the atmosphere is 29·94 inches, and the mean range of the barometer 1·09 inch. The days are sensibly shortened, and we are reminded of the decline of the year by various changes on the face of nature.

October.—This is usually a fine month, though with a reduction of temperature and increase of humidity in gradual transition; but, as the fruits are gathered and stored, the foliage exhibits its richly-diversified autumnal tints without exciting regret for the decrease of solar power. The thermometer, however, sometimes still attains the height of 70° in the shade, or even higher; while the barometer range increases to an average of 1·32 inch. The open

fields are again the scene of active industry, and various occupations demand the attention of the farmer.

November.—A cold and dreary month, the murky atmosphere heavy with moisture, venting itself in high winds and rain, the foliage gone, and the trees in their winter preparation for hard gales. Yet occasionally very fine days break the gloom, and make the still decreasing temperature less sensibly felt. The pressure of the whole atmosphere amounts to 29·97 inches, and the range of the barometer to 1·40 inch. The field-work is generally completed this month, and the farming implements are laid aside.

December.—This month opens, not unlike its predecessor, in high winds, humidity, and darkness; but towards its close, winter's full rigour becomes stamped. Severe frost does not usually set in till after the winter solstice; but a damp and chilly state of the atmosphere, more unpleasant than frost, often prevails. Northerly and easterly winds bring snow, and those south to west are charged with heavy rains. Mean range of the barometer 1·36 inch. Except for the presence of certain evergreens, vegetable nature seems to have fallen into a torpor.

The climate of Hartwell may be further illustrated by submitting the general annual mean derived from the average monthly results of the register for 1837, a year in which I had occasion to pay some marked attention to the details, in order to compare them with a summary of those observed at Oxford and Bedford. Two barometers were usually noted, but the reliance is on one made by Mr. Jones, of Charing Cross, for the observatory; and the thermometer is the self-registering one of Mr. James Six, as described in the Philosophical Transactions for 1782. There were three hygrometers, but the one selected for the comparison was similar to that by which I registered at Bedford; it was made with twisted filaments of the *andropogon contortum*, a grass of extreme sensibility, brought from India by my late friend Captain Henry Kater. The indications of this were shown by an index graduated to one thousand parts, from immersion in unslaked lime to saturation in moisture, and were afterwards reduced to degrees and tenths; and the dew-point was

approximately deduced. During 1837, there fell 22·81 inches of rain; and the prevailing winds were S.W., S., N.E., and W.—the least prevalent being the S.E. This is the general summary through the year:

	Max.	Min.	Med.
	Inches.	Inches.	Inches.
Barometer . . .	29·92	29·02	29·47
Extremes .	30·41	28·30	
Thermometer . .	60°·7	41°·8	51°·25
Extremes .	81·4	20·6	
Hygrometer . .	70·8	48·4	59·6
Dew-point .	55·6	37·0	

This may be deemed a tolerable view of the Climature of Hartwell for the present; but, as before remarked, the improved system of observation and registry now in practice there, will inevitably produce results of a more advanced and accurate character. And the object is well worth pursuit: for, though some branches of meteorology may long remain among the physical desiderata, yet much may be achieved respecting clouds, vapours, winds, thunder, lightning, hail, rain, ignes fatui, and other perceptible phenomena of the lower regions of the atmosphere. Considerable advance has already been made in inquiries as to the light, heat, specific gravity, moisture, electricity, and constitutional agents of our envelope; but the questions are so beset with difficulties, that our utmost knowledge in this respect does not grasp sufficient facts to reduce the various and uncertain phenomena to formal rule, or to establish anything like a certain theory. The zeal now exerted, however, in various observatories, as evinced by many published and widely-circulated registers, will very shortly set the long-prevalent fancy for the lunar cycle at rest, by which the revolution of the moon's nodes is to place everything exactly as it was nineteen years before.

§ 6. GEOLOGICAL NOTICES.

The extensive Vale of Aylesbury has evidently been denuded and scooped out by the action of water; the lithological peculiarities are therefore seen in a very detached and irregular manner. But the whole pertains to the upper part of the Jurassic system, known as the Purbeck formation.

Although Smith's celebrated map gave the substantial view of Buckinghamshire, it required much circumstantial correction; and this it received at the hands of my friend Dr. Fitton, when he was pursuing his elaborate inquiries into the strata below the chalk. This eminent geologist remarks, that one of the most prominent circumstances in the upper part of the sections hereabout, is the contrast between the arrangement of the sands and fuller's earth, or ochreous clay, and that of the beds which represent the Purbeck formation immediately below. The appearances presented, clearly shew that an interval must have elapsed between the deposition of the Purbeck strata and that of the lower green-sand, during which the surface of the former was disturbed, by the operation, no doubt, of water. He gives the following series of successive beds on a section disposed in the descending order of the strata, commencing with the lower green-sand, in a

Pit at Bishopstone, in "Church Furlong," belonging to Dr. Lee.

	ft.	in.
1. Soil bearing corn.		
2. Fuller's earth; greenish and brown. Thickness very irregular . . . 1 in. to In this bed are iridescent *mytili,* like those of the bed 7, below, and of the sections at Whitchurch.	1	0
3. Rubble; white, freshwater limestone, decomposed: containing *cypris* and casts of small *paludinæ,* in calcareous spar	4	0

		ft. in.
4. Clay and stone:—		
a. Light olive greenish fuller's earth	0 4	
b. Soft limestone	0 6	
c. Fuller's earth, like *a.*	0 2	
d. Stone, like *b.*	0 3	
e. Fuller's earth	0 2	
	——	1 5
5. "Sandstone," so called; firm, grey, and whitish, granular calciferous grit. It has distinct traces of the lines of deposition, and on the surface some approach to ripple-marks. *Quære.* Does it represent the grit of the Hastings sands?	6 in. to	0 9
6. Sand, alternating with ochre and clay:—		
a. Sandy ochreous clay	0 2	
b. Dark greenish fuller's earth	0 2	
c. Greenish grey sand, mixed with calcareous matter, and including scales of fishes	0 7	
	——	0 11
7. Fissile, calcareous clay, or marl, passing into stone		1 6

In the upper part are iridescent *mytili,* like those of 2, above, and of the pits near Whitchurch.

a. Dark, bluish grey, very fissile clay, containing *cypris* in great numbers, an oblong unio, and small scales of fishes. *(Lepidotus.)*

b. Clay, somewhat harder, less plastic.

c. Clay, lighter coloured, and still harder; approaching to stone.

All these divisions contain *cypris valdensis,* and another species; a small smooth *modiola,* a striated species; and *cyclas parva.*

8. "Pendle" *(Purbeck):* fissile, argillaceous limestone; here of a dark grey colour; in another adjacent pit almost white: containing *cypris;* casts of *cyclas parva,* some of which include casts of *cypris;* striated *modiolæ;* small *paludinæ;* and other small univalves, as in the Malm of Garsington	4 in. to	0 6

In some of the pits hereabouts, the "Pendle" contains also a depressed *planorbis,* as at Workley, in the Vale of Wardour; with *potamides carinatus.*

9. "Bottom Rock" *(Portland).* This, in one of these pits, is an agglomerate of fragments of shells; of a dark bluish hue, specked with white. In an adjacent pit, it abounds with *trigoniæ* and other Portland fossils. Thickness not ascertained. The beds below are not visible, and are unknown to the workmen.

The upper part of several other pits near Bishopstone (as at Southwarp and the vicinity of Dinton) agrees with the foregoing list, in exhibiting an alternation of clays, more or less like fuller's earth, with ochre and ferruginous sand: and the very dark clay which includes iridescent *mytili* occurs in so many places that there can be little doubt of its former continuity throughout this part of the country. It is particularly distinct on the side of the road from Whitchurch to Winslow, near the turn towards Dunton, about eight miles from Bishopstone; where, besides the usual

mytilus, it contains a *natica* and another spiral univalve *(melanopsis?).* Beneath these clays and sands is, universally, thin slaty marl or limestone, with alternate thin beds of clay, containing everywhere the same fossils—*cypris, modiolæ,* and spiral univalves—among which are *paludinæ,* a *planorbis,* and perhaps some other species. The whole group, therefore, clearly represents the strata above the Portland stone at Garsington, and in the Vale of Wardour; and is, no doubt, the equivalent of the "Slate," the "Cap," the "Dirt," and the other lower beds of the Purbeck formation, on the Dorsetshire coast.

This is extracted from the fourth volume of the second series of the Transactions of the Geological Society; where is also a table of the beds of a sand-pit at Stone. As this, however, only extends to a depth of fifteen feet, and is not opened in the place most favourable to the display of the superior strata, it is better to proceed to such observations as we have been able to make since Dr. Fitton's exploration. But the having met that gentleman at Aylesbury in the progress of his labours, is among the pleasing recollections which I must ever retain of that neighbourhood.

The environs of Hartwell consisting, as before stated, of the rocks of the upper oolitic group, even the surface exhibits the outcrop of a series of beds. Thus, to begin with the neighbouring village of Stone, in digging wells about the apex of the hill, they have hard work to obtain water at a less depth than fifty feet, and occasionally it is requisite to penetrate twenty feet lower. One section gave successive thin layers of vegetable mould, yellow loam, white sand, white rock, dark clay, rubble stone, and then ten feet of blackish clay, and finally thirty feet, or upwards, of hard bluish limestone. But about half way down the hill, towards Bishopstone, fifteen feet of rubbly limestone succeeded immediately to the vegetable mould, then eight of loam, and finally three of the bluish stone, when the springs were reached. Near the Bugle Inn, close to the park wall, however, the rubbly limestone was absent, and they had to descend several feet into the Kimmeridge clay, before they could obtain water, instead of getting it immediately below the compact limestone. This latter stratum is not above two or three feet thick hereabout, even disappearing altogether a few hundred yards nearer to Aylesbury, which has induced the erection of a brick-kiln there, where excellent red bricks are produced with ease.

Another variation in the stratification is observed in a field behind the Bugle Inn, beyond the Rood Gardens, where, immediately below the vegetable mould, a depth of several feet consists of very undulating striæ of brown sand, and of yellow, in separate patches, both formed of triturated rolled quartz, as clean as if it had been washed. There is, however, this difference, that, whilst the yellow has few particles smaller than two hundredths of an inch in diameter, the generality of the brown are not above half the size: both have a few small pebbles from the bigness of a pea to that of a nut, and an abundance of black ferruginous incrustations, frequently containing a heterogeneous kernel. On the road to Stone, there occurs a stratum of fine, brilliantly white sand, which, from its cropping out near the surface, has been dug with great facility over the space of about an acre. The purest is obtained from the depth of a dozen feet, and proves excellent in the manufacture of glass, as evinced in the prisms and spheres that Dr. Lee has had made of it, for experiments.

The fossils having been carefully collected, through the praiseworthy encouragement held out to the various labourers, the geologist finds a most interesting feast laid out for him in the Hartwell Museum; besides duplicates being abundantly furnished, by the kindness of Dr. Lee, to all amateurs. The elaborate collections of Z. D. Hunt, Esq. of Aylesbury, also teem with these "medals of Creation," and greatly assist in illustrating this locality. The characteristics of the limestone here, are casts of ammonites and trigonias, which meet the eye in every hole, corner, and rough wall; * whilst the oysters, mostly the *ostrea expansa*, stand third as to number, and from being of a stronger texture, have preserved their shells. The ammonites, however, are in such profuse abundance around Hartwell, that a word or two may be tolerated upon so distinguishing a feature of the basin; especially as those in the Kimmeridge clay have their pearly or nacreous coat as perfect and iridescent as when fresh from their native seas.

Although, without going far above or below the oolitic group of strata,

* The sign or cognizance of the Bugle Inn, near the Park, is a huge ammonite let into the house-wall.

no fewer than two hundred species of ammonites—agreeing in certain essential characters, but remarkably differing in others—are enumerated, the specimens found in this vicinity appear to be all of the biplex and triplex corrugated species, though varying from three inches to three feet in diameter; and were formerly known as the *snake-stones*. Still no specimen is found perfect, the parts around the mouth having been probably too fragile to resist the agitation of the mighty waters; for we have reason to imagine to ourselves a vast ocean sinking several thousand feet, that gradually became silted up to the brim. From the circumstance of the occurrence of ammonites being restricted to certain strata, and probably terminating with the chalk epoch, they are like fragments of an inscription, containing a row of figures indicating the age, but of which we have the conclusion only, without the beginning, thus: . . . . 000 000, whence we may infer that the missing figures were millions, billions, or trillions. Yet cognate multilocular or chambered shells, extend through the entire series of fossiliferous formations. Two of the most numerous in our own country being the following—

AMMONITES TRIPLEX, FROM THE HARTWELL LIMESTONE.

AMMONITES ANNULATUS, FROM THE LIASSIC SHALE.

The chambered shells to which the ammonite belongs, may therefore be considered as one of the most varied and widely-spread families of all the petrified *testacea*. Sir Henry De la Beche's researches have afforded satisfactory

evidence that the animal successively and exclusively inhabited the outer whorl of the shell. And when the specimen is full-grown, the margin, if found entire, is seen to be rolled outwardly and thickened, as observable in many recent univalves of various genera: the inhabitant not having till then obtained the power of making that extra deposit. This feature, together with the bosses and even spines that adorn some species of ammonites, sufficiently contradict the old opinion of there having been *internal* shells, partaking of the osseous duties in supporting the flesh, instead of being outward shells, or cases, protecting the softer parts and vital organs within. Another contemporaneous fossil many-chambered shell, the nautilite, has been frequently confounded with it; both being of a flattened spiral figure, all the circumvolutions of which may be divided by the same horizontal plane. And indeed the two must be deemed in a degree related, the principal distinction being that in the ammonite the place of the siphuncle is always upon the exterior of the transverse whorls, or on their dorsal margin; but in the nautilus that delicate organ of hydraulic adjustment is invariably near the middle, or towards the ventral margin. Still, although the extremes of the two species are readily discriminated from each other, yet the intermediate varieties of the ammonitiform nautili and the nautiliform ammonites can with difficulty be distinguished by the general observer. Among these the *nautilus pompilius*, or pearly nautilus, affords a truly admirable study, since it actually exists in the present, and is also found in the recent, and the ante-diluvian state,—being the only creature known to have maintained its station through the many supposed bouleversements and cataclysms which the globe has undergone: in more exact words—from still existing, it affords a valuable aid towards revealing the inhabitant of the allied fossil forms, which endured from the Devonian period through the carboniferous group, the liassic formation, the oolites, and the green sands, up to the London clay. How so brittle a fabric was enabled thus to withstand the force and fury of the flood, seems somewhat anomalous at a first glance; but the observant inquirer will soon perceive that, although apparently very tender and fragile, it really combines all the elements of the strength

required by its destiny, as designed by Omniscient fiat. Not only is the hull of the nautilus strongly secured by equivalents to beams and trusses, but, by a marvellous adaptation of the hydraulic powers of its syphon and septa, or internal shelly partitions, it can be floated or sunk as calms or storms may render necessary, at the discretion of the resident cephalopod, and moved by the re-action of water forcibly ejected from its funnel. This power of action has been beautifully expressed by Lord Byron, in alluding to the frail boat into which Captain Bligh was forced by the mutineers of the ill-fated Bounty:—

> "The tender nautilus, who steers his prow,
> The sea-born sailor of his shell-canoe,
> The ocean Mab, the fairy of the sea,
> Seems far less fragile, and, alas! more free!
> He, when the lightning-winged tornados sweep
> The surge, is safe—his port is in the deep—
> And triumphs o'er th' armadas of mankind,
> Which shake the world, yet crumble in the wind."

In conclusion it must be repeated that ammonites exhibit, to attentive examination, a systematic union of buoyancy and strength, being constructed every way upon the principle of a continuous arch, coiled like a helix round itself, with the base of the outer whorls resting upon the crown of the inner ones. The curves extend in all directions, and they are further strengthened by ribs and transverse plates, and air-chambers, so as to offer appropriate resistance to every external pressure. It is clearly ascertained that the inhabitant of these shells was armed with a powerful arrangement of the organs of prehension around the head, and hard mandibles for crushing shells and crustacea, and otherwise procuring food; in illustration of which, Dr. Lee has a large ammonite from a limestone quarry, with a crab's claw in it, which had either been swallowed by the cephalopod, or it might have flowed into the shell with the calcareous deposit when it had been abandoned.

During the time my esteemed friend the Dean of Westminster was

engaged on his admirable analysis of organic nature for his Bridgewater Treatise, I had, several times, under his hospitable roof at Christ Church, Oxford, the advantage of seeing the means he adopted for comprehending his subject; and, being strongly interested in the mechanical laws and purpose of multilocular shells, I cannot but enrich my page with the eloquent conclusion at which he arrived respecting them:

"On examining the proofs of contrivance and design that pervade the testaceous remains of the family of ammonites, we find, in every species, abundant evidence of minute and peculiar mechanisms, adapting the shell to the double purpose of acting as a float, and of forming a protection to the body of its inhabitant.

"As the animal increased in bulk, and advanced along the outer chamber of the shell, the spaces left behind it were successively converted into air-chambers, simultaneously increasing the power of the float. This float, being regulated by a pipe, passing through the whole series of the chambers, formed an hydraulic instrument of peculiar delicacy, by which the animal could, at pleasure, control its ascent to the surface or descent to the bottom of the sea.

"To creatures that sometimes floated, a thick and heavy shell would have been inapplicable; and, as a thin shell, inclosing air, would be exposed to various and often intense degrees of pressure at the bottom, we find a series of provisions to afford resistance to such pressure, in the mechanical construction both of the external shell and of the internal transverse plates which formed the air chambers. First, the shell is made up of a tube, coiled round itself, and externally convex. Secondly, it is fortified by a series of ribs and vaultings disposed in the form of arches and domes on the convex surface of this tube, and still further adding to its strength. Thirdly, the transverse plates that form the air chambers supply also a continuous succession of supports, extending their ramifications, with many mechanical advantages, beneath those portions of the shell which, being weakest, were most in need of them.

"If the existence of contrivance proves the exercise of mind, and if the higher degrees of perfection in mechanism are proof of more exalted degrees of intellect in the Author from whom they proceeded, the beautiful examples which we find in the petrified remains of these chambered shells afford evidence coeval and co-extensive with the mountains wherein they are entombed, attesting the wisdom in which such exquisite contrivances originated, and setting forth the providence and care of the Creator in regulating the structure of every creature of his hand."

To return to the Hartwell Basin. The cast of the extinct bivalve named *trigonia* is strongly marked by its tripartite division towards the hinge, though the shell has been completely absorbed by the limestone, leaving a vacuum, which is occasionally partly filled with pyrites. The two species of this once

prevailing type of *mollusca*, the *clavellata* and *incurva*, are easily recognised. There are, moreover, some flattish, fluted bivalves, resembling the *pecten camellosus*, although the ears are mostly destroyed. To these may be added the casts of several species of the *cardium*, the *mytilus*, and the *plagiostoma rusticum*, together with many others. Among the univalves there is a plentiful sprinkle of *pleurotomarias*, *naticas*, *neritas*, *turritellas*, and others, yet all casts. The black and brilliant scales of the *lepidotus minor* also abound in little heaps, but rarely in their original position.

On descending to the clay, we find that its fine and close texture has preserved, not only the most delicate shells, but even their nacre, with its many-tinted hues, and in one species the epidermis itself. Here, besides the *ostrea deltoidea*, shewing the effects of great compression, there are some other species also, however difficult it may be to pronounce on all the specimens. The *pinna quadrata*, with its serrated hinge, is a splendid though rare relic. Dr. Mantell, in his examination of the Hartwell fossils a few years ago, recognised a new species of pinna, coated with an uncommonly beautiful nacre, and related to the *lanceolata*, but probably the *granulata* according to the opinion of Professor Edward Forbes, who has kindly examined most of our specimens of this series. These pinnas are generally broken across, and the blade, or thin part, is more rarely found than the quadrangular small end, so that Dr. Lee himself possesses only two complete specimens, both about a foot long, and requiring to be imbedded in a lump of clay, in consequence of their prismatic structure (as in the recent pinna) rendering them very fragile. The little *modiola elegans* abounds to a great degree. Then we find some bivalves highly deserving of attention, of a stronger texture, and possessing no nacre, but of a horn-like brown: one of these is an *astarte*, two or three inches long, which Dr. Mantell distinguishes as the *Hartwelliensis*, it appearing to be a new species, and thus adding to the forty-six already known of this genus. The *cardium striatulum* (two-thirds of which is striated concentrically, while the furrows on the remaining portion radiate from one side of the hinge) is also found of a similar brown when high in the clay, but more fragile, and

slightly iridescent lower down. The smooth *pecten orbicularis*, and the delicately striated *arcuatus*, are generally found in separate valves. The abundant small *cucullæa* is the last of the brown shells.

We may now enumerate a few of the most prominent univalves, for the clay is in many places a rich storehouse for the microscope. The chief in beauty and perfection, as before alluded to, is the *pleurotomaria*, not only exhibiting a brilliant nacre, but in many places even the brown, wrinkled, and dotted epidermis above it, which in recent shells is the proof of their having been live shells, that is, inhabited when caught. Dr. Lee possesses four specimens of this, in various degrees of preservation. The *ammonites biplex* is in this stratum very abundant, splendid in nacre, and varying in size from a couple of inches up to a foot, though the large specimens are so broken, and the fragments so dispersed, as to render it difficult to estimate the entire diameter. There are also many *turritellæ* and *neritæ*, and more small shells than in the limestone above; these it would require much investigation to enumerate. The exuviæ of the *astacus* crab, identified by the Rev. Mr. Reade, rarely occur, but the elaborately-punctuated claw is frequently found.

The clay of this vicinity makes red bricks and tiles; whilst that from near Quainton, only seven miles distant, is positively white when baked, and for some purposes is preferred, as less absorbent of water. The saponaceous blue stratum of Aylesbury is designated the oak-tree clay, and in the Chiltern Hills to the southward passes into chalk and flints.

§ 7. PRODUCE.

It will readily be granted by economists, that agriculture could not be carried on if it did not yield an equal return for capital and industry employed in it as other businesses do: it is therefore but just that fair remunerating prices should have usually attended the exertions made in the principles and practice

of this, the most important of the economical arts. The local farming has immemorially been attended with satisfactory returns, notwithstanding occasional innovations have varied the *pros* and the *cons.* Although husbandry has been universally practised from the era of Adam, the theory—from our ignorance of the proper food, habits, and affinities of plants—still remains an opprobrium. The threat, however, of population pressing upon subsistence need not here be dreaded, since examples of what spade-husbandry may yet effect in the hour of need, has been brought to unequivocal proof in some of Dr. Lee's allotment patches.

The Hartwell meadows realise Drayton's panegyric, for a fine grass-farm of two hundred acres will support forty-five cows, each of which will yield five pounds of butter a-week, or, in all, eleven thousand seven hundred pounds per year; though on tolerably good grounds in the neighbourhood a cow gives only two hundred pounds of butter annually.* The best pastures admit of one bullock and two sheep to two acres, and others in general carry a bullock upon an acre and a quarter. On the arable grounds, the rotation of crops is —fallow, wheat, beans, barley, clover; but in some parts, as land becomes foul, it is fallowed for turnips; then follow barley, clover, wheat, oats, beans, and pease, and then wheat again. Good farming bestows from fourteen to sixteen loads of manure per acre on fallows for wheat crops, but a slighter coat for pulse and clover-leys. The produce of the highest cultivation is—for two bushels of wheat sown, twenty-eight gathered,—and the general produce of corn is from three and a half to five quarters per acre: though it is not unusual, in round terms, to hear it asserted that the average crop of wheat is generally nine times the seed. But this is so much larger than the mean proportion of the apparently more favoured climes, as to shew the advantage of moral over physical causes, and the triumph of industry over passiveness;

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* These conclusions are the result of much inquiry on the spot. The recent statement of three hundred and fifty pounds of butter per annum for each cow is incorrect; as is also that in Rees's Cyclopædia, copied into others, which asserts a Buckinghamshire cow's weekly average is eight pounds in summer, and six in winter.

for, barring the poetical hundred-fold of the Leontine fields, even the nine for one is above the average given by the old farmer, Columella, for the Italian regions. No wonder, then, that my old acquaintance, the Abbate Balsamo, Professor of Rural Economy in Palermo, should have been sent by his sovereign from Sicily to England, in 1803, to gain instruction in agriculture, at the public expense: the granary of Rome gathering vitally useful knowledge "inter ultimos orbis Britannos!"

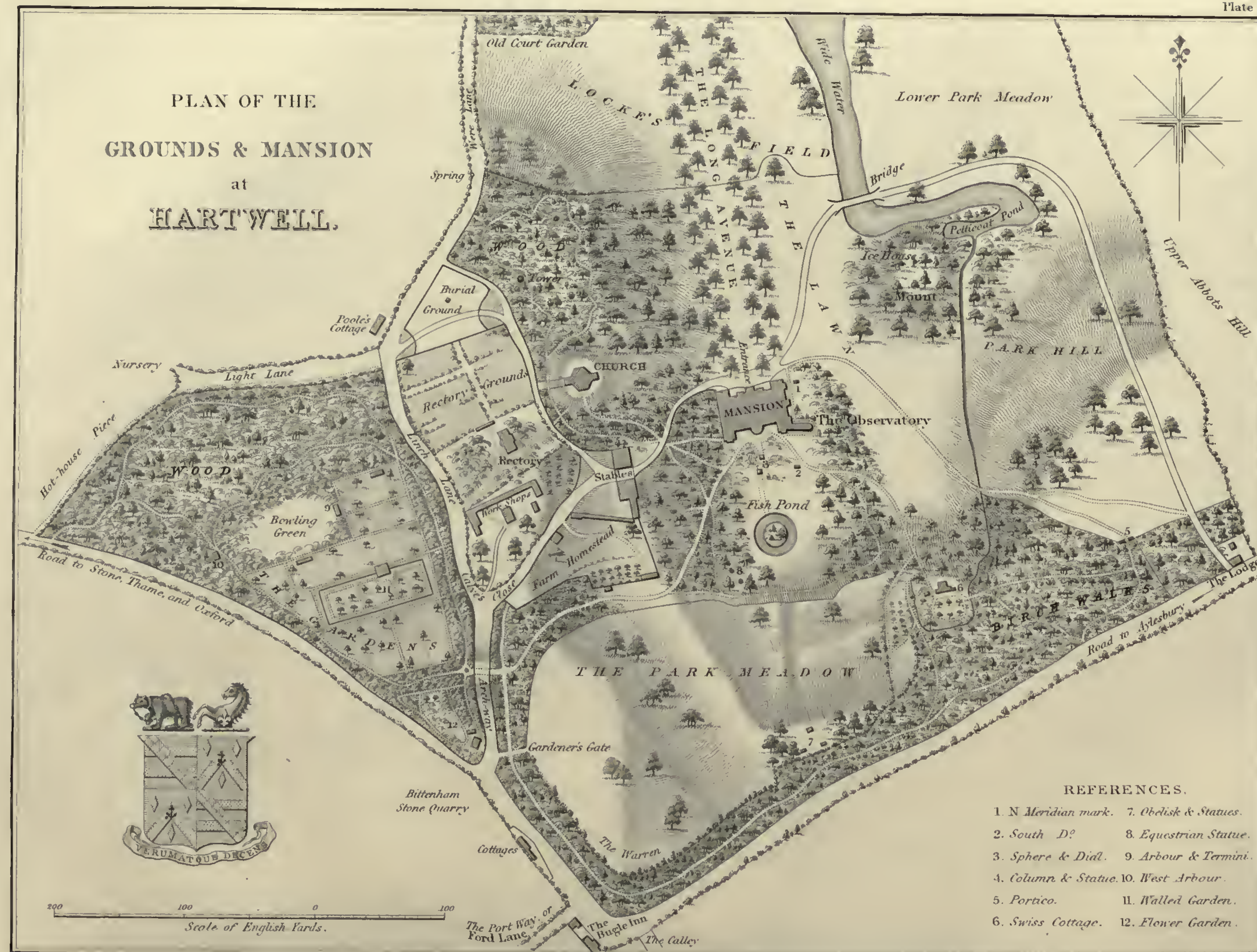
Under the usual husbandry, an acre of land produces annually one hundred and sixty pounds of ox-beef, one hundred and eighty pounds of mutton, one thousand four hundred and forty pounds of wheat, twenty-two thousand four hundred pounds of potatoes *(ten tons)*, or two tons of hay. For this produce, the lands are dressed somewhat differently to what they were before the Inclosure Act came into operation, and the tillage is now exerted more skilfully. At that time very little litter-manure was used, and the ploughings, harrowings, and levellings were not so frequent as is deemed necessary by the Neoptolemus of the present day. Still, it must be recollected, there are vestiges of very fair husbandry having obtained. From old deeds we know that the grounds were wont to be well cleared, the fences repaired, and the ditches cleansed, in order to the winning of good harvests; which, together with careful attention to cattle and pasturage, gave rise to the old proverb which boasts—"Buckinghamshire bread and beef." Marle was of erst the sole improver of the higher and drier lands, whence the well-known—

"He that marles land, may buy land,
He that marles moss, shall suffer no loss,
But he that marles clay, flings all away."

Strict impartiality will not allow this section to be closed without hinting that a whisper has obtained to the effect that, while the most sedulous care is bestowed, and every improvement adopted, to forward the agriculture of the Chiltern Hills, the farmer of the Vale of Aylesbury, rejoicing in the prolific

richness of his meadows, lies on his oars and turns a deaf ear to every suggestion of an instructive tendency. Is it so? The steadiness may merely be an habitual objection to the leaps and crotchets of speculation. From local peculiarities, there are but few handicrafts at Hartwell; and the only manufacture it possessed was that of lace-making with bobbins, an injurious employment for women, and wretchedly ill-paid, which has happily been reduced to almost zero by the frame-workers of Nottingham and other factory places. The men are therefore all husbandmen, laborious and well-conducted, while their wives and daughters find sufficient occupation in looking after their dwellings, children, dairies, and stock; which latter they manage without being so intrepidly reckless as their friends of Aylesbury, into whose dirty duck-rearing bed-rooms the grim blue-visaged Cholera found a suitable welcome, when he first visited England at the close of 1831. The farmers may hasten slowly, but it is taking the true road to health and competence, whatever any Manchester man may advance to the contrary. And I should venture to assert that the art of husbandry, as exhibited in the fences, drains, and dressings—the successive treatment of crops—the management of natural and artificial grasses—the cultivation of fruit and timber trees—and the general management of live stock, must be allowed to have here attained great excellency, however capable it may yet be of improvement. The whisperer above alluded to should therefore read Quevedo, who draws the pretty picture of a slanderer eating his own tongue.

In one respect the men of Aylesbury shewed that they—unlike their brethren of Northampton—kept a weather-eye open towards the march of improvement; and, instead of opposing the strides of philosophy by ignorance and prejudice, they were among the very first to effect a communication between their town and the London and Birmingham Railway. Kicking aside the "vested rights" of turnpike trusts, they constructed an arterial branch, or tributary, about seven miles in length, at an expense of 60,000*l.*; thereby placing themselves within ninety-five minutes' distance from London instead of its former six hours, and gaining a position for reaping some of the manifold


PLAN OF THE
GROUNDS & MANSION
at
HARTWELL.
Old Court Garden
LOCKE'S FIELD
THE LONG AVENUE
THE LAWN
Wide Water
Lower Park Meadow
Bridge
Petticoat Pond
Ice House
Mount
PARK HILL
Upper Abbots Hill
Spring
Weir Lane
WOOD
Tower
Burial Ground
Poole's Cottage
Nursery
Light Lane
Hot-house Piece
Rectory Grounds
CHURCH
Entrance
MANSION
The Observatory
Rectory
Stables
Linch Lane
Work Shops
Fish Pond
Farm Homestead
Calves Close
WOOD
Bowling Green
Road to Stone, Thame, and Oxford
THE GARDENS
Arch-way
THE PARK MEADOW
BIRCH WALKS
The Lodge
Road to Aylesbury
Gardener's Gate
Bittenham Stone Quarry
Cottages
The Warren
The Port Way, or Ford Lane
The Bugle Inn
The Calley
VERUMATQUE DECENS
200 100 0 100
Scale of English Yards.
REFERENCES.
1. N Meridian mark.
2. South Do.
3. Sphere & Dial.
4. Column & Statue.
5. Portico.
6. Swiss Cottage.
7. Obelisk & Statues.
8. Equestrian Statue.
9. Arbour & Termini.
10. West Arbour.
11. Walled Garden.
12. Flower Garden.
Jn Basire sculp.

advantages opened by facilitating intercourse and extending draught power, of the new and wonderful system of locomotion. This line was commenced in the winter of 1837, and opened on the 10th June, 1839; an occasion celebrated by the striking of a medal, bearing on its obverse the head of Mr. George Carrington, the Chairman of the Board of Direction, and on the reverse the names of the

DIRECTORS.

J. B. Boothby, Esq.	J. Lee, Esq. LL.D.
G. Carrington, Esq. F.R.A.S.	W. Rickford, Esq. M.P.
G. Carrington, jun. Esq.	T. Tindal, Esq.
J. Grubb, Esq.	Mr. R. Wheeler.

R. Stephenson, Esq.	*Engineer.*
T. J. Chapman, Esq.	*Treasurer.*
H. Hatton, Esq.	*Secretaries.*
A. Tindal, Esq.	

This spirited undertaking is already working its destinies: but even in only alluding to personal convenience, what a contrast appears between the roomy train-carriages, whisking one smoothly and safely along at the rate of thirty miles an hour, and the favourite old coach ycleped DISPATCH—good of its genus—which the trusty James Wyatt drove at a pace of seven or eight miles in the same time, and at double the expense and trouble of transit!

§ 8. THE HOME-STEAD.

Such is the estate; but on approaching the home domain near the middle of it, the grounds increase in beauty, and upwards of seventy acres around the mansion are thus characterised:

	A.	R.	P.
Kitchen Garden	11	2	30
Birch Walks	6	1	4

	A.	R.	P.
Park, and Swiss Cottage . . .	10	0	0
Mansion and South Lawn . .	7	1	14
Park Hill	15	2	0
North Lawn and Mount . . .	12	2	35
Mount and Walks	3	2	6
Court Garden	9	2	30

This distribution will be better understood by a glance at the annexed plan, on which the general bearing and form of the ornamented grounds will be seen at once, than could be expected from any written description. They have been judiciously planted, and ornamented with alcoves, statues, obelisks, and termini at appropriate places; while around are to be seen some fine specimens of the cedar, lime, elm, plane, oak, fir, beech, and sycamore. The abele, or white poplar, flourishes here in great luxuriance,

GROUP OF ABELES ON PARK HILL.

insomuch that Professor Martyn, in his elaborate edition of Miller, says,—"The finest abeles I ever saw were in Buckinghamshire, at Hartwell, near Aylesbury, the seat of the late excellent Sir William Lee, Bart. They are remarkably tall, with the cleanest bole imaginable."

And several of the other trees are remarkable, as may be seen by the measurements of some in the year 1849, which I have thus tabulated:—

Trees.		Circumference.		Height.	Girt.	Cubic Contents.	Where Standing.
	No.	Ft.	In.	Feet	Inches.	Feet.	
Elm	1	16	0	90	47	690	Near the bridge.
	2	15	6	70	45	620	In Locke's field.
Oak	1	7	9	60	23	100	Near the church.
	2	5	1	60	15	64	Near the hermit's cottage.
Ash	1	11	2	60	33	310	By the river.
	2	9	1	95	27	250	Near the church.
Beech	1	11	1	35	32	210	Near the fish-pond *(topped)*.
	2	9	0	55	30	230	Ditto.
Plane	1	8	0	60	28	130	In the garden ground.
	2	6	11	70	21	120	Ditto.
Scotch Fir . . .	1	6	0	60	19	97	Near the church.
	2	6	4	45	19	75	In the Warren walk.
Abele	1	12	4	65	37	360	Near the church.
	2	12	3	70	36	390	Near Park-hill.
Lime	1	10	8	65	32	220	In Locke's field.
	2	10	0	60	30	200	Near the church.
Cedar	1	11	0	50	32	290	Near the bowling-green.
	2	10	5	90	30	300	Ditto.
Pine	1	6	8	50	20	110	In the garden-ground.
	2	6	4	60	17	90	Ditto.
Sycamore . . .	1	11	8	60	35	340	Near the church.
	2	7	4	50	22	127	Near the cottage.
Acacia	1	3	2	23	14	26	In the garden-ground.
	2	6	0	20	24	90	Ditto.
Yew	1	6	0	30	24	50	Near the church.
	2	4	4	27	13	23	Ditto.

Besides these forest trees, there are also growing the Spanish chesnut,

the alder, the spruce, the birch, and the bay, or classical laurel: the Portuguese laurel likewise luxuriates in such profusion as to seem to be no longer a stranger in the locality. Miller remarks, that in his time this splendid evergreen had not long been cultivated in England; and that he had not seen any higher than ten or twelve feet. At Hartwell they have now grown to a height of twenty-five and thirty feet, with branches extending to ninety or one hundred in circumference, and clean stems of two and two-and-a-half feet, containing about ten cubic feet of timber. As to the common laurel, it flourishes as freely as if it were indigenous; and is perhaps of a longer standing in England than it is usually held to be. Thus Miller dates the introduction from Constantinople about the year 1578; but certainly Skelton, in the "Crowne of Lawrell," uses it as a familiar image more than eighty years before that time. In his dream of the garden with "ensanded" alleys, fountain, fish-ponds, and turf banks, he says he cast his eye—

> "Where I saw growyng a goodly lawrell tre
> Enuerdured with leaves, continually grene."

There are also various specimens of the large tree-box from twenty to twenty-five feet high; and some fine hawthorns, more symmetrical than are usually met with in this county; several of them are upwards of thirty-five feet in height, containing from fifteen to twenty cubic feet of timber, and spreading from thirty-three to forty feet in diameter in their heads or branches.

The trees in general are tastefully disposed in clumps and groves, forming a very paradise for numerous legions of noisy gregarious rooks, which perform their morning and evening flights with singular regularity—save in the breeding time—committing their audacious robberies or making reparation, according as they feed on grain or grubs: and these depredations are ever carried on at a great distance from home.

When I first visited Hartwell, in 1828, there was a fine old walnut-tree standing in great majesty; it was about twenty-one feet in circumference,

and might contain four hundred cubic feet of timber; and people computed that the wide-spread branches shaded half an acre of ground. It was supposed to be two hundred years old, and had long been the pride of the neighbourhood: but the roots decaying with age, it died in 1832. Dr. Lee, however, resolved to let it stand and decay *in situ*, and there it was blown down during a sharp gale of wind in the beginning of the year 1835: its appearance just before the catastrophe is shewn on the vignette at the end of this chapter. This noble sylvan object—for which Sir George Lee had refused 100*l.* offered by the musket-stock makers in the late war with France—had been greatly admired by the before-mentioned Professor Martyn, of the University of Cambridge, who was on terms of strict friendship with all the Hartwell family; and Sir William Lee, who soon discovered his merit, had presented him with the living of Little Marlow. It will therefore not be out of place to insert a letter, equally interesting and well written, which this amiable botanist addressed to Dr. Lee on the launch of his great work, and accompanying a presentation copy in four handsomely-bound folio volumes:—

See Page 49

Pertenhall, Jan. 8th, 1823.

My dear Sir,

Wishing to leave some memorial of our friendship—of your kindness to me—of my gratitude to your Uncle—of my regard to your Father—of my esteem for your Mother—and my respect for Sir William Lee, and all your family—I have taken the liberty of sending you a copy of my edition of Miller's Dictionary, the editing of which chiefly employed twenty years of my life. I request you to give it a place in your library; and I have sent it to Colworth * rather than London, the subject of the book being adapted to the country. If, when you cast your eyes on it, you will sometimes bestow a thought on me, it will be flattering to, my dear Sir,

Your sincere friend

and obliged humble servant,

Tho. Martyn.

The home-domain has numerous beauties, and having been embellished

* A seat in Bedfordshire also belonging to Dr. Lee, and remarkable for the beauty of its grounds.

by all the accessories that wealth and taste could confer, the eye meets with varying declivities and meadows; and the rill that would have stolen unseen away, has been cherished into an expanse of water. To be sure, he who has stood on a cliff, and seen the swelling waves furiously bursting among the rocks on which he stood, then rushing, foaming, and whirling into every creek and crevice with deafening roar; or he who has enjoyed the magnificence of mountain scenery, among cliffs and dells of striking wildness and grandeur, may profess indifference to a landscape which would better suit the pencil of Hobbema or Cuyp, than that of Salvator or Poussin. But surely rich plains, with occasional uplands, breathing placidity and repose, redolent of all the charms of judicious cultivation and the cheerfulness of civilisation, in a country blessed with uniform fertility, and yielding in every part of it something for the use and gratification of man, may be both studied and enjoyed. The horizon around affords views of great variety, equal however in interest, though differing materially in their display. The rising grounds to the north, and the bold range of the Chiltern Hills on the south, give an ever-pleasing finish to the landscape; objects, in regular succession, conduct the eye uninterruptedly from the immediate fore-ground, to the extreme distance, in harmonious colouring and perspective: while the farms, grazing herds, and flocks of sheep, give to them that kind of moral interest, which constitutes so large a portion of all the pleasing impressions which are produced by natural objects. From a considerable experience in varied scenery, I venture to assert, that the gratification of rambling among mountain-chains is, or ought to be, less durable than the contemplation of the characteristics forming "Hartwell's green retreats," as Lord Byron has poetically designated them.

They have, to be sure, been invaded at intervals—happily few and far between—by the capriciousness of fashion, between which and taste the relationship is but spurious. From descriptive hints in the early "terriers" of the estate, it seems that Hartwell was once a well-wooded and well-stocked emporium of game of all kinds; and it afterwards was cleared into numerous plots and interminable avenues, with woody spaces between. At length with

Plate III.

J. Basire Sc.

Hartwell House. (Temp. George 2nd.)

Reduced from a large view painted in 1749.

the Revolution and the landing of King William, came the Dutch taste of formalizing Flora; and these grounds, by about the year 1695, were squared out around the house, divided by walls and well-clipped evergreen fences, with prim yews cut into architectural forms, and watered by canals as straight as a pike-staff.* There are in the house several views of various parts of the gardens about this time, with their formal enclosures and mazy labyrinths, wherefore I subjoin, in illustration, a reduction from one painted in 1749, just before the renovation took place.

But Dutch taste was not fated to take durable root † in this country; neither was the fashion which followed very superior, for, without attention to site, most of the Dutch flats and canals, and parterres with tonsured hedges, were, as if by one general receipt, transformed into clumps and belts; thus rendering all the parks in every county, at one period, but so many specimens of modified topiary work, too meagre and artificial to imitate nature. And there were those who, by habitually talking of Kent and Repton, and other horticultural plotters, persuaded themselves that picturesque beauty could be reduced to an invariable canon; as if the resources of nature, and of art too, where they undertake to modify the landscape, were not infinite. Lancelot Brown, the most notorious of his order, and therefore dubbed Capability-Brown, was a great intermeddler at various seats in Buckinghamshire, but especially at Stowe and at Hartwell; a fact vaunted to me with great animation by his

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* Fashion is a most despotic tyrant. Speaking of these parallelogrammatic ponds, the Hon. Daines Barrington says,—"The late Lord Bathurst told me, that he was the first person who ventured to deviate from strait lines, in a brook which he had widened at Ryskins, near Colebrook. The Lord Strafford of that time, however, paying him a visit, and being carried out to see the effect of this new improvement, asked him to own fairly how little more it would have cost to have made the course of the brook in a strait direction." Sylvester (A.D. 1621) describes Adam as enjoying a once very favourite style of garden—

"Musing, anon through *crooked walks* he wanders,
Round-winding rings, and *intricate meanders*,
False-guiding *paths*, doubtful beguiling *strays*,
And right-wrong errors of an *endless maze*."

† At Totteridge Park, near Barnet, in Middlesex, another seat of Dr. Lee's, there is still left a fine long straight walk, with a wall-hedge of yew, and many other details of a King William garden.

son, whom I once accidentally met in that neighbourhood. Under the new régime, down came the yew arcades and avenue in front, the terraces were destroyed, the canal was filled up, the long walks upheaved, and the statues were transported to other and more remote stations in the grounds; and in a short time nothing remained but the mansion, the pavilion with a cupola roof in the centre of the arcades, and that at the head of the canal. When I first visited Hartwell, the pavilion was painted in fresco, with various passages from Don Quixote, the work of one of Louis XVIII.th's followers; who amused himself by caricaturing the Napoleon court in the faces of his principal personages. This edifice was taken down by Dr. Lee, in 1831.

This home-stead is, however, not cut and trimmed with servility to the capability-pattern, though many of its faults, with a few of its merits, have obtained. It is not fully circumvallated with belt, nor are the groups of trees packed precisely in the regulation clumps. The mansion, though situated so low as to have its prospects considerably contracted, is judiciously placed upon a dry and airy spot, around which the contiguous grounds are suitably laid out, and well wooded. The principal entrance is by a road from the lodge over Park-hill, descending from which it winds over the water, where it is crossed by a neat stone bridge of three arches, built by the tasteful James Wyatt *(see the plan)*. The great lawn is to the north and east, and bounded only by the natural slope of the land; so that an unimpeded prospect of the country to Aylesbury, with its church on a hill in the centre, presents itself, beautified by the sun's light shining upon it in the afternoon, while the sitting-rooms of the mansion are perfectly shaded. This lawn confers at once an air of spaciousness, and admits of pleasing recreation; and where it margins the piece of water, the botanist may find among the luxuriant vegetation, those—for this part of the country—rare plants, the wild calamint *(thymus calamintha)*, the creeping tormentil *(tormentilla reptans)*, the cat-mint *(nepeta cataria)*, and the horse-mint *(mentha sylvestris)*.

The principal front of the mansion is thus left open, but it seems from the old paintings, that there was formerly an avenue there *(see the plate)*; and

from vestiges still remaining, that there was another long one to the north, which latter certainly intercepted no remarkable eye-shot range of view from the house. Avenues, however, although objects conferring an air of grandeur on property, indiscriminately fell beneath the axe of the reformer, or spoiler, of that day; but the public taste has at length come to its senses on this subject, and we need not despair of seeing that again created, which it was so lately the insensate fashion to destroy. In this spirit, Dr. Lee has restored one which reaches from the north front of Hartwell House nearly to Haydon Mill, on the river Thame, a distance of eight furlongs. In its extreme breadth this avenue is about one hundred and fifty feet, and the double row or aisle on each side being thirty feet wide, leaves a central expanse of ninety. The trees, which consist of ash, walnut, oak, elm, lime, chesnut, beech, sycamore, and white poplar, are planted thirty-three feet apart. "Heydun Mylle" has belonged to the manor from about the year 1300, as shewn in the ancient charters, and other documents, now in the Evidence Room of Hartwell House. In Weir Lane, leading to this mill, is the spring which tradition would fain recognise as the well at which harts formerly slaked their thirst; however that may be, a grateful quaffer of the lymph has sung—

> "Stay, traveller! Round thy horse's neck the bridle fling,
> And taste the water of the Hartwell spring;
> Then say which offers thee the better cheer—
> The Hartwell water or the Aylesbury beer!"

Those who discovered that a kitchen garden is a deformity which ought to be hidden from human eye, contrived to rob the house of what had been till then the seat of hourly resort and of hourly gratification, a spot requisite for hospitality and social enjoyment. But, even under banishment, vegetables and orchard-fruits may be so managed as at least to constitute part of, or to communicate with, the pleasure-ground; instead of being consigned to the solitary concealment now so frequent. Indeed it is perfectly easy to plot one that shall be at once beautiful, instructive, and profitable. The Hartwell

kitchen-gardens, though kept at a distance, are not wholly in Brunonian guise; for neither the lady's private flower-garden—the *privye-garden* of old—nor the roomy and well-wired aviary are omitted,—while tastefully-serpentined walks among trees and shrubs of varied descriptions afford all the recreation which can be yielded by the most exclusive pleasure-grounds. In many points they would meet the views of the illustrious Bacon, whose zeal in this cause was so ardent, that he opened his essay on the subject with "God Almighty first planted a garden; and indeed it is the purest of human pleasures; it is the greatest refreshment to the spirits of man; without which buildings and palaces are but gross handyworks." He did not admire the knots or figures of divers-coloured earths, they being but toys—"you may see as good sights many times in tarts;" but his rules aim at the same end with those of the Hartwell designer, namely, to obtain, as far as the locality will admit of, a *ver perpetuum*. Some verses on the wall of an alcove, called the Shepherd's Bower, near the cedars on the Bowling-Green, attributed to Lady Elizabeth Lee, are somewhat descriptive of the spot:—

Shepherd, awhile, with curious eye,
  Observe yon path besprent with flowers;
  And where that varied wood embowers
Its sweetly scented pinery:

There flowrets gay, and shrubs have strove,
  To guerdon fair the shaven green;
  And thence yon sacred dome is seen,
Peering amid its circling grove.

Now, as untutor'd fancy wills,
  Pursue her steps.—See! where she leads,
  Thro' archen woods, o'er daisied meeds,
And valleys wild, and rising hills.

Then say—why seek the lofty tower?
  From scenes like these shall courts detain?
  Peace loves to haunt the rural plain,
And pleasure wonnes *(dwells)* in Shepherd's Bower.

And opposite this Shepherd's Bower, is another light but retired structure embosomed among the trees, called the Green Arbour, where was inscribed from the same pen—

When all within is peace
 How nature seems to smile,
Delights that never cease
 The live-long days beguile.

THE OLD WALNUT TREE.

[See page 37.]

CHAPTER II.

THE SUCCESSIVE LORDS OF THE MANOR OF HARTWELL, FROM THE CONQUEST TO THE PRESENT TIME: PEVEREL, DE HERTEWELL, LUTON, HAMPDEN, AND LEE.

§ 1. THE PEVERELS.

FROM ancient authorities it seems that there were various tenures here at an early period, William of Normandy having divided the lands among his several followers; by which, real property lost at least one-third of the value it possessed in Edward the Confessor's reign. The goodliest shares of the district at and around Hartwell being wrested from the possession of Thane Alwyn, were bestowed by the Conqueror upon his natural son, or, as Sir Walter Scott has it, his supposed son, William Peverel; on his brother Odo, the noted Bishop of Baieux; and on his favourite gonfalon, Walter Giffard, who became Earl of Buckingham. The principal manor at Hartwell was that of Peverel, consisting of six hides and three virgates; the Bishop of Baieux had four hides (three held under him by Helto, and one by Robert); Walter Giffard, two hides; William the Chamberlain, two hides; and Walter de Vernon half a hide. The Norman, who was equally keen and rapacious, prided himself in having made the grand state-survey, as witness his charter to the Abbot of Westminster, dated *post descriptionem totius Angliæ:* but it should be recollected there was already extant at that time a general survey of the whole kingdom made by Alfred. Maistre Wace, the early Jersey poet, corroborates history by stating, in his Chronicle, that William "let castles be wrought, and poor men to be sorely swinked;" and that he so thoroughly

surveyed England, that there was not a hide of land but he knew who had it, and what it was worth:—

——volenters voleit saver
D'Engletere la terror,
E la laise e la longnur,
Toz les feez e les tenemenz
E les services de tote genz,
Quant de conteez i sūnt trové
E quant de viles en chascon conté
Quant de barons la terre avoit
E cumbien de terre chascon tenoit,
Quanz de feez de chevaliers
E cumbien de franc-fermers,
Les serganties e les sokages,
Les petiz sokemen e les vilenages;
Cumbien des charues en chascon vile,
E kant de boueez en la charue;
Cumbien de terre chascon home avoit,
E en quele manère il la tenoit,
E quel servise faire devoit,
E quei sa terre valer purreit.
Tuit ensemble fist enquerre
Par serement par mie la terre,
Od grant diligenz ceo fist escrivre
E de ceo en fist un grant livre.
Le livre est Domesday apelé
E en la trésorie le roi uncore guardé.*

Thus Domesday-Book became a trusty legal evidence, the *Liber Judiciarius vel Censualis Angliæ;* and this accurate and great survey of the kingdom is justly esteemed, as Spelman truly said, "if not the most ancient, yet, without controversy, the most venerable monument of Great Britain." Thus of the several manors in question, the following details are singularly in point, from

* In a miscellaneous note-book now preserved among the Hartwell MSS., Sir William Lee has made this note: —"William the Conqueror had an income of near three millions per annum, ut dixit A. Onslow, Speaker." He assuredly had easily gained a magnificent prize!

the exact style of the book, as to the state and condition of Hartwell at the opening of the eleventh century, as near as translation will render it:—

Helto * holds of the Bishop *(Baiocensis)* three hides in Herdeuuelle. There is land to three ploughs (Te'ra ē iii. car.), and they are there, with one villane *(copyholder)* and seven bordars *(cottagers)*, and one mill of eight shillings value. In the whole it is, and was always so esteemed, worth fifty shillings. Three sochmen *(freeholders)* held this land: one, a vassal of Archbishop Stigand's *(of Canterbury)*, held half a hide; another, a vassal of Earl Lewin's, had two hides; and the third, a tenant of Avelin's, had half a hide; and they might sell or grant them away. In the same vill Robert holds of the Bishop one hide. There is arable land for two ploughs *(carucates)*; there is one plough, and another may be kept *(or made)*. There is one villane and four bondmen *(servi)*. It is and was worth twenty shillings; in King Edward's *(the Confessor)* time forty shillings. Avelin, a thane of King Edward's, held this land and might sell it.

Walter Giffard holds, and Hugh de Bolebec † of him *(as the sub-feudatory of Walter)*, two hides in Herdeuuelle. There is land sufficient for two ploughs, and they are there, with four villanes *(homagers* or *copyholders)*, three bordars, and four bondmen *(servi)*. It is and always was worth thirty shillings. Two vassals of Sired's held the same (before the Conquest), and might dispose of it; and they now hold it.

William Pevrel holds in Herdeuelle six hides and three virgates, and Tehel is his tenant. There is land to eight ploughs *(carucates)*, there being three in the demesne; and sixteen villanes with four bordars have five ploughs. There are four bondmen *(servi)* and meadow for eight ploughs *(i. e.* sufficient to support their teams). Its whole value is, and was, one hundred shillings; in King Edward's time seven pounds. Alwin, a thane of King Edward's, held this manor, and might sell it.

Walter de Vernon holds half a hide in Herdeuuelle. There is land for half a plough-team, but there is no plough there. It is and was always worth ten shillings. Turgot, a thane of King Edward's, held this land, and might alienate it.

William the Chamberlain *(camerarius)* holds, and Robert of him, two hides in Herdeuuelle. There is arable land for two ploughs. There is one in the demesne; and two villanes, with four bordars, have one plough. It is, and always was, estimated at thirty shillings. Wlmar, a priest *(confessor?)* of King Edward's, held this land, and might sell it.

It should be observed, that arable land is always expressed by *terra* in the Liber Censualis, in contra-distinction to pasture, meadow, and wood-lands.

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* Helto was a man of substance. He was also the tenant of the Bishop's manor of Dinton, consisting of fifteen hides; and of that of Stone, which was seven hides.—It is conjectured that the land belonging to the Bishop of Baieux was afterwards reckoned as in the parish of Stone, and not in Hartwell; and that the lands of Walter de Vernon and William the Chamberlain became annexed to Great Kimbel.

† Molebec in the printed edition of Domesday Book; but by a misprint.

The *hide* of land, and its Norman variation the *carucate*, differed in its contents from one hundred to one hundred and twenty acres, and was equal to four yards: it also denoted as much land as could be annually tilled with a single plough, or a yoke of oxen; and the *virgate* was its eighth part. The word *ley*, *lee*, *lea*, or *lay* (Saxon *leaz*), became a general term for the untilled green sward, sometimes called *gis*-ground; whilst the *essart* was broken-up woodland. In some of the ancient territorial documents the term *slade* appears, the intent of which seems to denote the natural dry bed of a torrent, and not a brook or glen as hath sometimes obtained.

§ 2. DE HERTWELLES AND LUTONS.

The lands of the Peverels were seized by King Henry II. in 1155, and granted to his son John Earl of Mortaigne. On the accession of that prince to the throne, the Honour of Peverel became annexed to the Crown: in which it always after continued.

Very soon after the accession of King John, the manor of Hartwell appears in the possession of a feudatory tenant who derived his name from the place. Designations of this kind had been immemorially a frequent custom, insomuch that Camden observes he never could find an hereditary name before the Conquest: those in Domesday-Book were brought in by the Normans, who themselves had adopted them not long before that day.

In the 3rd John (1201) Walter de Hertwelle gave the King three marks for the scutage of one knight,* held of the honour of Peverel; and in 7 John (1205) Barnabas, the son of Walter, gave the King forty marks as his relief,

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* Rotuli de Oblatis et Finibus, 8vo. 1835, p. 160. Lipscomb quotes Rot. Pip. 2 Joh. to the same effect.

to receive the same knight's fee, which was then in the King's hand, in consequence of the death of Walter de Hertwelle his father.*

Barnabas was succeeded by William de Hertwell, whose name is recorded in the Testa de Nevill;† and who left issue another William, who was, in 1254, in the wardship of Ralph fitz Nicholas.‡

At the inquisition made before the justices itinerant in the county of Buckingham, in 39 Hen. III. (1256), concerning the rights and liberties belonging to the King, and other matters connected therewith, the jurors of the hundred of Stanes returned that the town of Hertwelle was of the honour of Peverel, and was held in chief of the King, and the heir was in the custody of Ralph fitz Nicholas by the gift of the King; and the men thereof did suit of court to the honour, and gave yearly for all dues eight shillings: and the bailiffs held pleas of the unjust driving of cattle, and the view of frank pledge, and had the return of the King's writs; and the manor was estimated as six hides and a half, and had enjoyed the same liberties in the time of King Henry, the grandfather of the King that now is.§

In 4 Edw. I. (1276), on an inquisition made respecting ancient rights and liberties of the crown which had been discontinued, and other like matters, it was returned that Alice de Luton and William her son held the manor of Hertwelle, and that the same manor had been wont to pay to frank pledge, but now that payment was commuted for the sum of eight shillings paid at the Exchequer.‖

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* Rotuli de Oblatis et Finibus, 8vo. 1835, p. 292.

† "Willielmus de Hertwelle tenet unum feodum in capite de domino Rege de honore de Notingham,"—which was the same as the honour of Peverel. Testa de Nevill, p. 245.

‡ Nom. Mil. 38 Hen. III. quoted by Lipscomb, in his History of Buckinghamshire.

§ Rotuli Hundredorum, fol. 1812, p. 31. The same jurors reported that Richard the chaplain of Hertwell had made encroachments on the king's highway to the length of four perches: and the like report was repeated in 4 Edw. I. Ibid. pp. 38, 45.

‖ Rot. Hundred. vol. i. p. 44. Another report made at the same time was, that among those who had received gifts or gain for the exercise of their offices, Thomas de Bray, late sheriff, had received from William de la More of Hertwelle, and Agatha of the same place, imprisoned in the prison of Eylesburie, 20*s.* for exercising his office at the precept of the king.

Among the documents in Dr. Lee's muniment room, there is an undated charter of William, son of William de Hertwell, conveying the manor and appurtenances to Alice de Luton, and William her son; the seal of which is inscribed "S' WILL'I DE HERTWELL:" there are also two original patents of Henry III., dated 18th of November, 1270, and 10th of April, 1271, as well as a final concord levied in Easter-term of that year (55 Henry III.), all relating to the transfer of the estate from the family of Hartwell into that of Luton. Among the ancient archives there is also a very neat little charter of "Robertus Luyton, Dominus de Hertwelle," dated the Sunday of the feast of the decollation of St. John Baptist, 49 Edward III. with the seal of arms perfect, inscribed "Sigill' Rob'ti Lytone." These documents are highly interesting in the history of the place, as clearly shewing one of the most important occurrences, by which the present line of succession is virtually connected.

The first of the charters abovementioned, is to the following effect. William son of William of Hertwell gives to Alicia de Luton, and William her son, two parts of his manor of Hertwelle, with all its appurtenances and services, the advowson of the church of Hertwelle, and the chapel of Little Hamdene: also the tenement with the appurtenances which Constance his mother held of him in dower in the aforesaid vills; and likewise the tenement which William de Chalgrave and Isolda his wife held of him in Little Hampden for the term of their lives. For this grant Alice and William her son paid him one hundred marks of silver, and acquitted him against Jacob son of master Moses the Jew of Oxford, and certain other Jews, of forty marks of silver in which he was then bound to those Jews. This transfer was confirmed by the King's charter, dated at Westminster, 11 April, 53 Hen. III. (1269), and was enrolled on the Charter Rolls,* as follows:—

Rex archiepiscopis etc. salutem. Inspeximus cartam quam Willielmus filius Willielmi de

* Rot. Cart. 53 Hen. III. m. 12.

Hertwelle fecit Aliciæ de Luton et Willielmo filio ejus de maneriis de Hertwelle et parva Hamdene cum pertinentiis in hac verba: SCIANT presentes et futuri quod ego Willielmus filius Willielmi de Hertwelle dedi, concessi, et hac presenti carta mea confirmavi Aliciæ de Luton et Willielmo filio ejus duas partes manerij mei de Hertwelle cum pertinentiis, ut dominicis, homagiis, serviciis liberorum hominum, willenagiis, advocatione ecclesiæ de Hertwelle et capellæ de parva Hamdene, boscis, pratis, pasturis, eschaetis, et omnibus aliis rebus ad illas duas partes pertinentibus sine ullo retenemento; habendas et tenendas eisdem Aliciæ et Willielmo filio ejus et heredibus vel assignatis ejusdem Willielmi de capitalibus dominis feodi illius per servicia quæ ad illas duas partes pertinent imperpetuum. Preterea concedo pro me et heredibus meis quod totum illud tenementum cum pertinentiis quod Constancia mater mea de me tenet in dotem in predictis villis et similiter totum illud tenementum cum pertinentiis quod Willielmus de Chalgrave et Isolda uxor ejus de me tenent in parva Hamdene ad terminum vitæ ipsorum Willielmi et Isoldæ de hereditate mea, quæ quidem tenementa cum pertinentiis post decessum ipsorum Constanciæ, Willielmi de Chalgrave et Isoldæ deberent reverti ad me vel heredes meos, post decessum ipsorum Constanciæ Willielmi de Chalgrave et Isoldæ integre remaneant eisdem Aliciæ et Willielmo filio ejus et heredibus vel assignatis ejusdem Willielmi, tenenda simul cum predictis duabus partibus cum pertinentiis sicut predictum est de capitalibus dominis feodi illius per servicia quæ ad illa tenementa pertinent imperpetuum. Pro hac autem donatione et concessione predicti Alicia et Willielmus filius ejus dederunt michi centum marcas argenti et me acquietaverunt versus Jacobum filium magistri Mossei Judei de Oxonia et quosdam alios Judeos de quadringentis marcis argenti in quibus eisdem Judeis tenebar tempore confectionis presencium. Et sciendum est quod ego Willielmus filius Willielmi teneor facere predictis Aliciæ et Willielmo filio ejus et heredibus vel assignatis ejusdem Willielmi in curia domini regis coram justiciariis suis de Banco vel coram justiciariis itinerantibus in itinere suo totam inde securitatem, quam ipsi et amici eorum providebunt si necesse fuerit. In cujus rei testimonium presens scriptum sigilli mei impressione roboravi. Hiis testibus, Gilberto de Braci, Johanne Neyrnuit, Ricardo de Sancto Claro, Gilberto le Gode, Johanne Aleyn, Willielmo Blacstan, Willielmo de la Mershe, Johanne de Caam, Willielmo de la Morre de Hertwell, Ricardo filio Roberti de Ayllebur', Willielmo filio Simonis de Ayllebur', Johanne de Aldeswell, et aliis. NOS autem predictas donationem et concessionem ratas habentes et gratas eas pro nobis et heredibus nostris concedimus et confirmamus sicut carta predicta quam predicti Alicia et Willielmus filius ejus inde habent rationabiliter testatur. Hiis testibus, Willielmo de Valencia fratre nostro, Johanne de Warennia comite Surriæ, Philippo Basset, Roberto Waleraund, Roberto Aguillon, Willielmo de Wyntereshull, Willielmo de Aette, Willielmo Belet, Willielmo de Faukham, Galfrido de Perci, Stephano de Eddeworth, Radulpho de Bakepuz, Rogero de Wanton et aliis. Datum per manum nostram apud Westmonasterium xj. die Aprilis, anno regni nostri liij°.

At the sessions of the justices itinerant held at Newport Paynel, in the octaves of Saint Hillary, in the 14th Edw. I. (1285), Alice de Luton was summoned to answer to the King by what warrant she claimed to have view

of frank pledge and weyf in her manors without special licence; privileges which belonged to the King and his crown. This record, commencing—"Alic' de Luton sum' fuit respondenđ đno Regi de ꝑlito quo waro clam' ħre visum fᵃnci pleg' et weyf in manᷤio suo de Hertwell' et Hamden' que ad dñm Regē et Coronā suam ꝑtinent sine licenc' et volunt' đni Reg' vł ꝓdecessoꝝ suoꝝ Regñ Angl', &c."—is to be found in the volume *Placita de quo Warranto*, Rot. 4 đ. Alice came by her attorney, and said that the King that now is, had granted to her by charter that she should hold her view. This charter, by which she had been released for life of the yearly payment of eight shillings for the view of frank pledge, and also her tenants from coming to the view of frank pledge at the court of the royal manor of Hadstock, in Essex,* and further from the women-brewers *(braciatrices)* of her lordship being fined in the King's court for breaking the assize of ale, power being given to her to fine them in her own court,—was exhibited to the justices, and ran in the following terms:—

Edwardus dei gratia, etc. Sciatis quod concessimus pro nobis et heredibus nostris dilectæ nobis Aliciæ de Lutone quod ipsa et homines et tenentes sui de Herthwell et Parva Hamdene tam nativi quam liberi toto tempore ipsius Aliciæ quieti sint de secta quam debent ad curiam nostram honoris Peverelli de Haddestok, et de veniendo ad visum franci plegii ad eandem curiam, et quod braciatrices quæ sunt de tenura ejusdem Aliciæ in villis predictis quamdiu eadem Alicia vixerit pro transgressione assisæ cervisiæ fractæ non amercientur in curia nostra predicta, sed quod eadem Alicia braciatrices illas in curia sua propria pro hiis transgressionibus cum necesse fuerit amerciari faciat, et amerciamenta illa libere et quiete percipiat toto tempore predicto. Concessimus etiam eidem Aliciæ pro nobis et heredibus nostris quod toto tempore predicto quieta sit de octo solidis annuis in quibus nobis tenetur de visu franci plegii et de omnibus arreragiis in quibus nobis similiter tenetur de eisdem octo solidis. Ita quod heredes vel assignati predictæ Aliciæ ac homines et tenentes sui predicti post decessum ipsius Aliciæ sectam predictam nobis vel heredibus nostris faciant et ad visum franci plegii veniant ad curiam predictam; et predicti heredes vel assignati predictos octo solidos annuos solvant sicut antea fieri consuevit. In cujus rei testimonium, etc. Teste me ipso apud Westmonasterium quinto die Decembris anno regni nostri nono.

So, as to the view of frank pledge, the plea was dismissed *sine die*. And

* A court for the honour of Peverel was held at the royal manor of Hadstock, in Essex.

as to *weif*, she declared that she did not then claim the liberty of *weif:* and the sheriff was charged that he should maintain the King in seizin of that liberty.*

In 1294 Alicia de Luton was deceased, when, in pursuance to a royal writ dated on the 5th of October, an inquisition was taken by the King's escheator for the county of Buckingham, on Saturday the feast of Saint Dionysius, to inquire what lands and tenements she had held in chief of the King in that county. It was found that she held at Hertwelle one messuage worth per annum, with the whole inclosure, 20*s*. At Hampden, one messuage worth 2*s*. There were at Hertwelle 60 acres of arable land in demesne, worth, at 8*d*. an acre, 40*s*. per annum; at Hampden, 36 acres of arable in demesne, worth, at 4*d*. per acre, 12*s*.; at Hertwelle, 8 acres of meadow, worth, at 18*d*. an acre, 12*s*.; and at Hertwelle, of fixed rents, as well free as customary, 76*s*.; the like at Hampden, 17*s*. 1½*d*. At both places were twenty custumars and cottage tenants *(custumarii et coterelli)*, and their work was worth per annum 17*s*. 1½*d*.; and at Hampden was a wood worth per annum 6*s*. 8*d*. All the aforesaid were held of the King in chief by the service of one knight's fee. Her son, William de Luton, knight, was found to be her heir, and he was of the age of 56 years at the feast of Saint Mark the Evangelist last past. Total, 10*l*. 2*s*. 11*d*. Thence due to the Sheriff of Buckinghamshire, for hydage, per annum 12*d*.†

Sir William died within a few months after his mother; whereupon an inquisition was taken on Friday next after the feast of the translation of Saint Thomas the Martyr (July 3, 1295), and it was found that he held at Hertwelle a messuage worth per annum, with its whole inclosure, 20*s*.; a garden worth per annum 4*s*.; in demesne 129 acres of arable, worth, at 8*d*. an acre, 4*l*. 6*s*.; eleven acres of meadow, worth, at 18*d*., 16*s*. 6*d*.; two acres of pasture severable, worth 12*d*. At Hampden, one messuage worth 2*s*.; in demesne 36 acres of arable, at 4*d*., worth 12*s*. At Hertwelle and Hampden, of free and

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* Placita de quo Warranto, fol. 1818, p. 91.

† Inq. post Mortem 22 Edw. I. No. 17.

customary tenants, in fixed rents, 4*l.* 12*s.* 1½*d.*; twenty custumars and coterells, whose work was worth 17*s.* 1½*d.* At Hampden, a wood, yielding the yearly profit of 6*s.* 8*d.* All the aforesaid were held in chief except the garden and 69 acres of arable, and four acres of meadow, and two of pasture, which were held of divers lords, the deceased performing or paying nothing for them, because he had acquired them of divers men, who were bound to defend and acquit the said William and his heirs against all men. Thomas, son of William, was his heir; and of the age of fifteen at Christmas last past. Pleas and perquisites worth per annum 4*s.* Whole value, 12*l.* 18*s.* 5*d.*, except 12*d.* paid for hydage.*

There was assigned to Beatrice, the widow of William de Luton, by way of dower, the capital messuage of Hertwelle, with the whole inclosure, worth per annum, 20*s.*; 86 acres of arable, worth 47*s.* 4*d.*; six of meadow, worth 9*s*; and one pasture, worth 6*d.* Also the third part of the capital messuage in Hampden, with the grange there, worth 8*d.*; 24 acres of land, worth 8*d.*: two parts of the wood, worth 4*s.* 5*d.* Also the rent and service of William Bum, free tenant in Hampden, 12*d.* Moreover the custumars and coterells in Hertwelle following, viz. Robert Attebreche, Geoffry Baret, Adam le Juvene, John de la More, William de Morton, William Winter, Geoffry le Write, Richard Witinge, John Waryn, William Tony, Geoffry Winter, Roger le Despenser, William le Write, John Roberd, Ralph de Fraxino (or Beech), and John Faber (or the smith), whose rents, customs, and services extended per annum to 43*s.* 4*d.*

Proof of the age of Thomas, son and heir of William de Luton, was taken at Fletemerston before the King's escheator on the 2nd Sept. 29 Edw. I. (1301). The witnesses showed that he was 21 years of age on the feast of Saint Thomas the Apostle last past, and that he was born at Hertwelle and baptized the next day in the church there: but the document is too imperfect

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* Inq. post Mortem 23 Edw. I. No. 20.

from injury by damp, to furnish further particulars of the minute information with which this species of record generally abounds.*

On an inquisition taken at Hertwelle on Thursday next after the feast of Saint Matthew the Apostle, 20 Edw. III. (1346), it was returned that Margery, wife of Thomas de Luton, held the manor of Hertwelle, with the advowson of the church, excepting six messuages and three virgates, by the service of one knight's fee, as of the honour of Peverel, having been enfeoffed with Thomas her late husband, by fine in the King's court at London, and that they now after her death remained to Nicholas, their son, and the heirs of his body lawfully begotten. They were worth in all ten marks. She died on Wednesday next after the feast of Saint Hilary last past; Nicholas was then thirty years of age. She also held lands called Northcote and la Leye, in Berkhampstead, co. Hertford.†

Sir John Neyrnuyt, knight, had petitioned the King that, as he was assessed to find two men-at-arms to be sent to Portsmouth for the King's next passage, in consequence of having married Margery, widow of Thomas de Luton, now by her death he was legally released of such service. In answer to his petition, an inquisition was held at Aylesbury on Tuesday next after the feast of Saint Ambrose, 20 Edw. III. (1346), on which the jurors returned that Sir John held the manor of Hertwell and the advowson, excepting six messuages and three virgates, worth in all ten marks, and which had devolved to Nicholas, son of the said Margery. She had died on Friday next after the feast of Saint Hilary, and there remained to the said John Nernuyt at Flete Merston and Blakgrove, in the said county, lands and tenements worth ten marks; also at the Grove next Mentemore, in the said county, lands worth ten marks.‡

On an inquisition taken at Aylesbury on Thursday next after the feast of the Nativity of Saint John the Baptist, 33 Edw. III. (1358), it was returned that Nicholas de Luyton held of the King in chief the manor of Hertwell and

* Probatio ætatis in Turri London.

† Inq. 20 Edw. III. first numbers, No. 29.

‡ Ibid. No. 59.

the manor of Hampden, the former worth forty marks and the latter ten marks, as a knight's fee. A second inquisition, taken on the same occasion, at Hertwell, on Wednesday in Easter week, returned that Nicholas held nothing of the King in chief, but held the manors of Hertwell and Little Hampden, with the advowson of Hertwelle, of William de ——thewell and his heirs by one clove gilliflower at the feast of Easter for all services, as appeared by a fine levied in the King's court, 55 Hen. III. The manor was worth 20*l*. Nicholas died on Wednesday next after the feast of Saint Gregory. Robert, his son and heir, was of the age of six years and more.*

Sir Robert de Luton died on the 17th of March, 1391, being the Friday before Palm-sunday. He held lands in the several counties of Buckingham, Hertford, Leicester, and Northampton. Two inquisitions were held relative to his lands in Buckinghamshire, the contents of which are as follow. On an inquisition taken at Whitchurch on Tuesday after the feast of St. John the Baptist, 15 Ric. II., it was found that Robert de Luton, knight, held in his domain as of fee, on the day he died, the manors of Hertwelle and Little Hampden with their appurtenances, and the advowson of the church of Hertwelle, of the King in chief by knight's service. The manor of Hertwelle was worth 40 marks, and that of Little Hampden 10 marks. And that Robert died on Friday next before Palm-sunday, happening on the 17th day of March last past; and that William, his son, was his nearest heir, and of the age of twelve years and more. By the second inquisition taken at Aylesbury on the Saturday before Christmas, 15 Ric. II., it was found that Robert de Luton, knight, lately deceased, possessed one messuage, thirty acres of land, late belonging to John atte Welle, one toft and twenty-four acres of land called Bridportus, with their appurtenances, in Hertwelle; sixty acres of wood and one wood called Lutelwode and Ranesgrove, in Little Hampden, being enfeoffed together with Katharine his wife and the heirs of their bodies, which Katharine is still living, of the feoffment of Baldewin Pigot knight and Roger Balle

* Inq. post Mortem 33 Edw. III. (second numbers), No. 104.

chaplain. The aforesaid messuage, &c. were all held of William de Hertewelle by the service of one clove of gilliflower by the year; and were altogether worth 26*s*. 8*d*. The son and heir of Robert was William, then of the age of 12 years and more.

Sir Robert de Luton, the last of his family, was knight of the shire for the county of Buckingham in the parliaments of 1387 and 1390. He left an only daughter and heir, Eleanor, married to Thomas de Stoke.

§ 3. THE HAMPDENS.

The estate remained with the Luton family about one hundred and sixty years, when Death—"that mighty huntsman," as Young calls him,—had earthed all the heirs male. Eleanor de Luton then carried the manor to Thomas de Stoke, who, empowered *jure uxoris*, presented one William Prestwold to Hartwell Church in 1431. Stoke had issue an only daughter, Agnes, who was married to Sir Thomas Shingleton, or Singleton, and he thenceforward held Hartwell in her right. He was sheriff of the county in 1443, and knight of the shire in 1450; and was buried in the church of the Grey Friars of Aylesbury, where he was one of the founders of a chauntry. Agnes, surviving two husbands, caused her daughter, Elizabeth, to be married to John Hampden, of Kimbell, a younger branch of the very ancient family of the Hampdens. She herself was remarried to Henry Petyt, Esq. who also died before her; and on her death in 1479 an inquisition was taken of her lands under the name of Agnes Petyt, widow. By this judicial inquiry, which was held at Aylesbury on Saturday next after the feast of All Saints, 19 Edw. IV. (1479), it was ascertained that the deceased lady held in her demesne as of fee, on the day on which she died, the manor of Hertwelle and Little Hampden, with the advowson of the church of Hertwelle, of Wymer Hertwelle, by the render of one clove gilliflower to be paid yearly at the feast of Easter; it was worth 20*l*. beyond all reprises. She also

held the manor called Stokes manor, in Hanslepe, of Richard Duke of Gloucester, by the service of a fourth part of one knight's fee, and by paying yearly one pair of gilt spurs of the value of six-pence, or six-pence instead, at the feast of Easter: it was worth 18*l.* She died on the 1st Oct. last past, and William Hampden, son of Elizabeth daughter of Agnes, is her cousin (grandson) and heir, and of the age of 25 years and more.

The Hampden Family was even then one of the most ancient and opulent in the county, and derived the surname from one of its best estates; Hampden being—as the old parchment roll belonging to the Earl of Buckinghamshire expresses it—"a Lordshipp and Mannor scituat on Chiltren Hille." The same very curious roll supplies much interesting information respecting the pedigree and alliances of the Hampdens; and from it we learn that "the first mention which is founde to be made of any of the Hampdens, is to be sene in an auncient antiquitie written in parchement and remeyning at Hampden, whereof there be sondery coppies in sondery partes of the same sheire, and thereby it appeareth that before the Conquest there was a cōmission directed to the Lorde of Hampden then being, that he should be assistant with his ayde towards the Xpulsion of the Danes out of this Lande, w[ch] by reasonable conjecture should be at the generall avoidance of that Nation, by Edw. the Confessõ, Kinge of England, in the yeare of our Lorde 1043, and before the Conquest 23 yeares."

The manor appears, by the ancient rent-rolls which are still preserved, to have improved under the Hampdens, although occasional and arbitrary fines of land were laid on by the hand of power. At the astounding crash of Church property which took place at the Reformation, Oseney Abbey was suppressed, when its possessions reverted to the Crown, and were reserved in the King's hands for about three years. The lands in the Hartwell estate* which

* On an inquisition taken at Stone on Monday next after the feast of Saint James the Apostle, 12 Ric. II. (139 .), it was returned that it was not to the damage or prejudice of the king or other, if the king granted to William vicar of the church of Cudlyngton, Elias vicar of the church of Wycombe, Ralph Hale, and John Worton, to give a toft and 8½ acres in Stone and Hertwell to the Abbat and Convent of Oseney; also a messuage, one caru-

the convent had held, were made part of the endowment of the Dean and Chapter of Oxford; and are described in the *Valor Eccles.* 26 *Hen. VIII.* as being of the annual value of forty shillings, subject to two shillings and six pence hidage *(imppm p' hidag. ibm pr. ann.)* to Sir John Verney, Knight, and his heirs. The clear annual amount *(valet clare)* consequently is stated to have been thirty-seven shillings and six pence. The eastern boundary of the manor was also impinged upon by the grasping tyranny of Henry, in his hunt after the ecclesiastical property of the once holy Aylesbury. And this lawless rapacity was carried on throughout the kingdom with severity and cruelty, by him who, in an early proclamation *(see Rastell's Entries)* to his good and loving subjects, asserted that, "having alway a tender eye, with mercie, pitie, and compassion toward his sayd subiects, minding of his high goodnesse and greate benignitie, so alwayes to imparte the same vnto them, as justice being daylie administered, all riggour be excluded." Such was the initiatory promise of the gross and sanguinary Hal!

This branch of the Hampdens remained in possession of Hartwell upwards of one hundred and eighty years, when Sir Alexander Hampden—a cousin of the celebrated Patriot—and who had received the singular honour of being knighted by James I. at his own house,—having no surviving issue, made his will in 1617 "according to the computation of the Church of England." This was a testament of great moment in the succession, for Sir Alexander's sister, Eleanor, being married to Sir Thomas Lee, Knight, of East Claydon, and Morton *(Moor-town)*, in Dinton, and now becoming the heiress both of her father and brother, brought their manor and estate into the possession of that ancient family: this lady was married in November, 1570, at the age of sixteen years, and a necrological inscription to her memory exists on a brass plate, inserted in a slab, within the communion rails of Dinton Church, in Roman capitals.

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cate of land, and twelve acres of meadow in the same vill, which John Bracy and Alice his wife hold for life, and would after their deaths come to the aforenamed. The whole were held of John Bryan by knight service, and the rent of 9*s.*; the messuage, toft, and land, were worth 16*s.* 8*d.* a-year, and the twelve acres of land 6*s.* 8*d.* (Esc. 12 Ric. II. No. 116.)

As Dr. Lipscomb, in his County History, has given a *death*-blow to the rhyming conclusion of this memorial, and is otherwise inaccurate, the reader may like to have the exact words—

> HERE LYETH THE BODIE OF Y[E] LADIE DAME ELINOR LEE, WIFE TO S[R] THOMAS LEE, OF MORTON, K[T]. WHO HAD ISSVE BETWENE THEM 24 CHILDREN, & SHEE DEPARTED THIS LIFE THE 6[TH] DAY OF APRIL. 1633.
>
> HER CHILDREN LOST A MOTHER AT HER END
> THE CHVRCH A MEMBER & Y[E] POORE A FREND.

§ 4. THE LEES.

The family into which Eleanor Hampden had thus married, was an off-set of the Lees or Leighs of High Lee, and Lyme, in Cheshire; * but is understood to have had its first settlement in this county at Morton, in Dinton, one of the nine manors which tradition asserts Queen Emma to have bestowed on the church, in gratitude for her signal escape from the ordeal of the red-hot ploughshares. The time of the Lees being first introduced into this neighbourhood is now not exactly ascertainable: but from a careful examination of the early monumental brasses still remaining in Dinton Church,† some elaborate pedigree-lists, and other trusty documents, it is clear that they were established here at an earlier period than is usually assigned. Some of these must necessarily be produced, to establish the starting-point. In the ordinary

* This was a very potent family. Dr. Pegge observes that there are five different ways of spelling their name, as *Lea*, *Lee*, *Legh*, *Leigh*, *Ley*: and, he asserts, there were such numbers of this name in Cheshire that they have still a common saying there—"as many Lees as fleas."

† Dinton Church, dedicated to St. Peter and St. Paul, is entered by a very curious Norman door-way; and close to it is the old manor-house, now the property of the Goodall family, but formerly the seat of Mayne, the Regicide.

accounts, the first of this family distinctly mentioned as having come to Morton was William Lee, who died in 1486; and the authority for this is a brass inserted in a long stone slab, whereon are the graven effigies of a male and a female, the latter in long robes, but injured by the loss of the head. The man is beardless, and habited in a close doublet with a belt, from which hangs a rosary; his hair is short, shoes pointed, and his hands elevated in prayer. The inscription, in three lines, runs—

1 Pray for ye soulis of Will'm lee of Morton in ye
p'isch of Donton and Anne his wiffe ye which
2 Will'm discesid the ix. day of Octobre the yere of
oure lord God A M° CCCClxxxvj.
3 And for ye love of God and of oure lady
to Say A pater noster and an Ave.

The Morton branch were of great consideration in this district. On an old brass plate in the south aisle of this church we read—

Pray for the Sowle of Joh'n Lee of Morton gentilman
the whiche Joh'n lythe buried in the parysch chirche
of Seynt olyffe in Seluer stret in the Cite of London, and he
died the vj. day of Marche the yere of oure lord A M
v^c and iij on whose Sowle ih'u haue mercy. Amen.

And on clearing away some old pews in the same church, in 1829, a stone slab was discovered under the seat belonging to the Rev. Mr. Goodall's tenants, opposite the manor-pew, with the small effigies of a man and woman in brass, and the subjoined inscription under them on a plate. This, agreeably to Plato's advice, consists of four lines only; though some illegible vestiges of words cut in the freestone below the brass plate, indicate a continuation. The effigies are more matter-of-fact memorials than had obtained in an earlier age, when the lion typified the gentleman's courage, and the dog shewed the obedience and fidelity of the lady: here we behold Francis Lee in a furred civic gown, with

long hanging sleeves, and his hands devoutly placed together, while his wife is habited in a very matronly style—

Hic iacent Franciscus Lee de Moreton Gen'osus et
Elizabeth ux' eius qui filios habuern't vij et iiij
filias p'dict'q; Franciscus Obijt xxiij de Auguti *(sic)*
Ano d'ni M° CCCCC° lviij° quar' a'iar' ppiciet' de' ame'

These Lees were probably the immediate successors of the Comptons *(temp. Hen. IV.)*; and those of Quarrendon, though they arrived from Warwickshire, were also remotely from Cheshire. This stock, of which the present representative is Lord Dillon, was seated in Buckinghamshire from the year 1460; and a little more than a couple of miles N. by E. of Hartwell House, are the remains of the once-interesting chapel of Quarrendon. It stands in

solitude and neglect, the devastation having been rapidly accelerated during the last twenty years, to my own knowledge: until very recently it contained some relics of the rich monuments formerly erected in honour of distinguished members of the Lee family; and I well remember, only in 1828, examining that of Sir Henry Lee, the "Queen's Champion," reposing in blazoned armour, with the insignia of the Garter. Near him the recumbent figures of his father, Sir Anthony Lee, and his Lady Margaret; and a third, of which the inscription was illegible, although the gold and colours were tolerably fresh in them all. But neither sentiment nor taste were at hand to prevent wanton mischief and desecration; the chapel roof was even then off, the area was used as a cow-pen, and the whole was strewed with fragments of sculptured marble and alabaster. I was not therefore surprised in June, 1842, to find the destruction so far completed, that the monuments had disappeared, there being merely undistinguishable pieces of them, torn down and thrown on the ground. *Sic transit, &c.* And this, in the fourteenth century, had belonged to the all-potent and imperious Spensers!

To return to the Hartwell line. Thomas Lee, the eldest son and heir of the aforesaid patriarchal Sir Thomas and Dame Eleanor, his wife, was high sheriff of the county in the fourth year of King Charles the First; and married Jane, daughter of Sir George Throckmorton, of Fulbrook, by whom he had issue a son, Thomas, his heir. The latter, about the year 1632, married Elizabeth, second daughter of the Hon. Sir George Croke, Knt. one of the Justices of the Court of King's Bench, a judge of eminent ability and learning, whose three volumes of reports of cases decided in the reigns of Elizabeth, James, and Charles, are regarded as high authority in law to the present day.

This third Thomas died in 1644, leaving several children, of whom the eldest, from a lukewarm Parliamentarian, became a zealous Royalist, and accompanied his step-father, Sir Richard Ingoldsby—the "honest Dick" of Henry Cromwell, but an alternate regicide and cavalier,—when he endeavoured to bring over the temporising Lord-Keeper, Bulstrode Whitelocke, with the Great Seal, to the King's party. Soon afterwards the Lord of Hartwell was chosen to

represent the borough of Aylesbury in the convention parliament which met at Westminster on the 25th of April, when he directly voted for Charles the Second's restoration. As a reward for these services, that monarch raised Mr. Lee to the rank of Baronet in the same year, by the style and title of "Sir Thomas Lee, of Hartwell;" and created him a K.B. He continued nearly to the close of his life to hold a seat in parliament, and took a distinguished part in the debates. He was also one of the Lords Commissioners of the Admiralty in 1689 and 1690, in which year he died. He married Anne, daughter and heiress of Sir John Davies, of Bier-court, Pangbourne, in the county of Berks, and grand-daughter of the poetical Sir John Suckling, a maternal ancestor of the heroic Nelson. This Suckling was just as zealous a royalist as Nelson; and his strong feeling stimulated him to raise and equip a troop of horse at his own expense, placing himself at their head. From the misbehaviour of the advance of the royal army before the Scotch Covenanters, Sir John was so sharply and maliciously scourged in ballads and squibs by his brother poets, that his premature death at the early age of thirty-two is attributed to them; but other accounts state it to have been a consequence of wounding his foot with a rusty nail, or other impediment, in hurrying on his boots to pursue a servant who had robbed him. In either way it was a result of *mortification;* and we shall presently see cause for his annoyance at satiric stings.

Sir Thomas Lee, the second Baronet of that name, succeeded his father in February, 1690; before which event, and until the time of his own death, he was returned to Parliament for Aylesbury. He married Alice, daughter and co-heir of Thomas Hopkins, Esq. citizen and merchant of London: by this union he had issue: 1. Thomas, his successor; 2. William, who was bred to the common law, and rose to be Chief Justice of England; 3. John, who became a Colonel in the Guards; 4. George, who studied the civil law and was appointed Dean of the Arches, Judge of the Prerogative Court, and a Lord of the Admiralty; and 5. Sarah, who died unmarried in 1693. The station, learning, and integrity of those useful and eminent public characters,

William and George, demand a few moments of special attention. Browne Willis, in a manuscript which he drew up and presented to Sir Thomas Lee,* and which is now preserved in the Bodleian Library at Oxford, mentions the second Baronet's family, and then proceeds in these terms:—"Thomas Lee, his eldest son, who succeeded him in his title, a gentleman of a public spirit, justly honoured with his county electing him one of their knights in this present Parliament convened A° 1721, before which, even ever since he first came of age, he has been returned for the ancient borough of Wycombe, which corporation, together with that of the county-town of Bucks, has generously elected his second brother, a no less ingenious and deserving gentleman, Mr. William Lee, for their Recorder; who is a person eminently skilled in the laws of his country, and may be said to have made as great a progress in the study of them, and have as much practice, as any gentleman of his years has been known to acquire in his profession."

Besides this mention of Sir William Lee by the pen of a friend, there are various recorded proofs of his ability and excellent bearing. Sir James Burrow, himself a well-known lawyer, describes him as "a gentleman of most unblemished and irreproachable character, both in public and in private life, amiable and gentle in his disposition, affable and courteous in his deportment, cheerful in his temper though grave in his aspect, generous and polite in his manner of living, and deservedly happy in his friendships and family connexions, and to the highest degree upright and impartial in the distribution of justice." These qualifications, added to untiring and industrious perseverance, were pretty sure of commanding success; and he achieved it, although he was rather pains-taking than ambitious. He had no very decided political bias; but, having been born in the year of the Revolution, he was wont to remark that, "As he came in with King William, he was bound to be a good Whig."

* This manuscript is a thin quarto volume in a leather cover, and for Willis, who sported a very scribble-scrabble hand in general, is tolerably written. On the fly-leaf he says,—"This acc' was drawn up by mee, B. Willis, A° 1724 or 1725, as I remember, and presented to Sir Tho. Lee."

After having repeatedly declined to serve in the House of Commons, he was elected a burgess for Chipping-Wycombe in 1727; and, in the fourth year of George the Second, appointed one of the Judges of the Court of King's Bench. On the promotion of Lord Hardwicke to the Great Seal in the tenth year of that monarch, Judge Lee was advanced to the dignity of Chief Justice of the same court, and knighted.* In 1745 he was sworn of the Privy Council; and, upon the death of the Right Hon. Henry Pelham, Chancellor of the Exchequer, on the 6th of March, 1754, he performed, *ad interim*, the functions of that high office, until his own demise about a month afterwards. This event was deeply deplored both by his private friends and professional colleagues: in a letter from Lord Hardwicke to Sir George Lee, 11th of April, 1754—three days after Sir William's decease—he says, "May I presume to make use of this opportunity to condole with you on the loss of my old friend, the late Lord Chief Justice. I truly lament it, as of a most valuable friend, for whom I had a sincere affection, and of an able and most upright magistrate and servant of the crown and public." He must indeed have been as well an extraordinary, as an exemplary and toilsome man. Among the interesting muniments preserved at Hartwell, there are no fewer than two hundred manuscript note-books of cases on circuits and in Banco, with the miscellaneous remarks of this eminent official, testimonies alike to his disciplined habits and methodical industry; and many other memoranda of a very varied nature, from medicine to metaphysics and from politics to cookery, which must have been thrown together in the brief intervals of a busy and honourable life, evince an uncommon propensity to diarizing. There are also preserved at Hartwell, in a nearly continuous succession, many

* In this year died a cousin of Sir William's—William Lee, of Abingdon—the singular mention of whom in biography deserves notice. At the time of his death he was ninety-one years of age; and had then seventeen children, seventy-eight grand-children, and one hundred and two great-grand-children: in all one hundred and ninety-seven. "Such men were greatly wanted," says Grainger (Supp. page 225), "at this period, to repair the depopulation of the Civil War."

years of Rider's popular almanac—"The British Merlin"—which the Chief Justice seems to have carried about with him, and to have entered his road-notes therein. But, after a memorandum of "6 bushells of oats for 4 horses per week and much bran, hempseed good in their corn, walking them in dewy grass in the morning very good;" and another teaching that "for rheumatism, elder tea," we are startled by the sudden announcement, "I marryed to Mrs. M. M., May, 1733," meaning Mrs. Margaret Melmoth, the rich relict of James Melmoth, Esq. At his death, he had been a judge in the Court of King's Bench upwards of twenty-four years; and for nearly seventeen of them had presided therein, with an ability equally stamped by judicious caution and unquestioned integrity. In early life he was elected Recorder of Buckingham: but Browne Willis remarked that "he conferred more honour *upon* that town than could be imparted by the highest titles derivable *from* it."

Nor was his still more meritorious younger brother George less fortunate in his career than Sir William: and it is on all sides admitted that his knowledge as a civilian, experience as a senator, abilities as a statesman, and high-principled rectitude as a man, were eminently serviceable to his country. He was born in the year 1700, and at the age of seventeen entered as an under-graduate of Clare Hall, Cambridge, whence he removed to Christ Church, Oxon, where he was matriculated April 4th, 1719. On the 22nd June, 1724, he supplicated the Convocation at Oxford to allow him the two years and three quarters which he had previously passed at Cambridge, in order to his becoming B.C.L. in that term. In 1729 he became LL.D., and was admitted an advocate in Doctors' Commons. His qualifications and energy opened to him the road to the highest honours of his profession; besides which he was elected into successive parliaments to represent Brackley, Devizes, Liskeard, and Launceston. He was knighted, made a Privy-Councillor, and established Dean of the Arches and Judge of the Prerogative Court of Canterbury: thus he and his brother had the rare good fortune of presiding, at the same time, over the highest civil and common law courts in this country. Besides being Chairman of the Committee of Privileges and Elections, Sir George, in

1741, was appointed one of the Commissioners for executing the office of Lord High Admiral, which place he resigned in 1744. When the misunderstanding occurred between the two first personages in the royal family, Dr. Lee joined the party of Frederick Prince of Wales; and on the Ministers interfering with the Court of Stannary, in 1748, he, with Lord Egmont and Lord Bolingbroke, organised a parliamentary opposition, to counteract and thwart the servants of the crown in every scheme that had not an evident tendency to the advantage of the nation. But in this he proceeded with caution and discretion, insomuch that Smollett, describing the Prince's "band of auxiliaries," says of him, "Dr. Lee was a man of extensive erudition and irreproachable morals, particularly versed in the civil law, which he professed, and perfectly well acquainted with the constitution of his country." The excellent and amiable Frederick, who, unfortunately for the nation, was cut off in the forty-fifth year of his age, entertained a sincere regard for the Doctor, and had even designed him for his minister; for so entirely had he acquired the Prince's confidence, that his Royal Highness frequently repaired to Doctors' Commons to consult with his learned and able adviser. After this prince's lamented death, in 1750, Dr. Lee became Treasurer of the Household to his widow, the Princess Dowager of Wales, an office which he did not resign till 1757: and there are still preserved among the Hartwell muniments six large volumes of his accounts as Treasurer and Receiver-General, most neatly and elaborately registered, as well as duly audited.

The high consideration which the regretted prince bore for Dr. Lee, may be inferred by the perusal of a letter or two out of numbers among the Hartwell documents: the which will also afford a glimpse of the political strategy of the day.

Clifden, 5 a clock (*Aug.* 12*th*, 1747).

Dr. Dr. Lee,—I enclose to Y^u^ this Packitt, sent to me by L^dy^ Gordon. I read Y^r^ Letter, but not L^d^ Sutherland's, which, without beeing Seal'd, was sent to me; You'll be so good to return it me, that I may Send it to that L^d^, and to make the proper Memorandums out of it for next winter. Oswald is chosen for the County he push'd for, against Pelham's will; may be we may have a

Chance for him now. What do Y^{u} think of an Offer made by Y^{r} means through Gordon to him of a C^{k} of the G^{n} Cloth, provided he'd be thoroughly with us? Tell me Y^{r} Opinion of it, which Y^{u} know has the greatest Weight with me; I think he is worth having. Good bye, take care of Y^{r} health, and depend in all times on the friendship of

FREDERICK P.

Tuesday, 12 a clock (26*th July*, 1749).

Dr. Doctor,—I am desir'd by an unfortunate L^{dy} to know of Y^{u} if L^{d} Cook has allready engag'd Y^{u}; if not, I hope You'll protect poor L^{dy} Mary. Be so good to keep this private, it must come soon to an *Eclat.* If You are not engag'd You'll receive all the Papers when Y^{u} come here, which I hope will be at the time fix'd. No news, but that th'Ordinance is not giv'n yet: L^{d} Vere Beauclerk has laid down. Good night.

FREDERICK P.

Thursday, 11 at night (*Augt.* 11, 1749).

These are the Papers, D^{r} D^{ctr} Lee, relating to L^{dy} Mary Cook, they are extracts of her own Letters; severall of these things are vouch'd by a Parson, who, if Sub-Pœnad, would Speak. Fazackerly's Opinion to the Family is to move a Habeas Corpus, in the King's Bench; in case that happens She'll Swear the Peace. Fazackerly desired Y^{r} Opinion above all Should be tak'n; these things were drawn and maneg'd by poor dead Erskine, who consulted with Fazac. in the Family's name. Return these Papers to me when Y^{u} come here, there is no haste till than. Ev'ry thing is at a Stop now at London, except a Battle Royall between the contending D^{krs} for the Ad^{ty}, one insisting for L^{d} Trentham, and t'other for long Herbert. God bless 'em all, and rid this Island of t^{hr} Stuff, which is the devout Prayer of y^{r} Sleepy and hearty Friend,

F P.

L^{r} H^{e} *(Leicester House)*, at 3 o'clock.

I have slept well, and my cough continu's to diminish, which I owe to my forbearance of yesterday's Ball, where I did not go. I am sorry, D^{r} D^{or}, Y^{r} Hoarseness and Cough augments; I hope You'll take all imaginable Care to be better Soon, and don't go out by no means till Y^{u} are thoroughly well. Let us put of the debate intented for Tuesday till Thursday. I flatter my-Self You'll be able to apear than. Be so good to Send me the Q^{tns} propos'd by the Bearer, that I may Shew 'em to-morrow at the meeting, and advance things in Such a manner that ev'rything might be settled for Thursday. Write to me who Y^{u} want Should S^{cd} Y^{u}; since the Torys have behav'd So, and we have had Pony last time, I think we ought to take one of our People; in Short, give me all th' Informations for to-morrow Y^{u} can, for without Y^{u} I am lame. Pray remember Y^{r} health, and get soon well; all the Campain depends upon it. Do (you) think P^{trick} Gibbons would like to do it? I mean to S^{cd} Y^{u}. Adieu.

F. P.

11 clock at night.

Dr. Lee,—the Preliminarys are Sign'd, and the Suspension of Arms is agreed; if Y^{u} read Chesterf. apology, You'll see in what it consists, except that the Republick of Genua keeps Finale, and that Don Philipp gets to Parma, and Plaisance the Mirandole. All the rest is the same, and we might have had the same Peace, even a better one, this time 12 Months, and have sav'd 11 Millions. These are the Facts; what the Consequences will be, Y^{u} and I guess, and time will Show it. Be so good to be at 1 o'clock at L^{r} H^{se} a Wednesday, where many things must be talk'd o'er. Good night D^{r} Lee.

FREDERIC P.

4 of clock.

Dr. Lee,—I hope Y^{u} come to-morrow to the House to assist us in the following Question, which L^{d} Egmont mov's, and S^{r} E^{d} Thomas Seconds. The Words of the Treaty are so ambiguous, and, in the room of meaning the Utrecht Peace, may be misconstrued for that one made by Charles II.; so that I expect rare Sport of it, and a little Swagg'ring and threat'ning will do well just now. Adieu.

FREDERICK P.

L^{r} House, Thursday (*2nd March*, 1 *o'clock*).

Dr. Lee,—Yesterday's debate has greatly been in our favour, and their Numbers are fallen from 280 to 203; ours augment: the beginning of this Bill their M^{ty} was 120, and that of late nights was but 66. What will become of the Sea Bill Y^{u} may guess, if our Numbers can but hold; Y^{u} remember th'Excise Bill; pray God this wicked Bill and its Authors may feel the Resentment of the Nation, as those of th'Excise Bill did, and may Y^{u} Soon give 'em the last Stroke. I never doubt of Y^{r} heart and head, only I lament Y^{r} legs. Pray tell me when You'll be able to come. Adieu.

F. P.

11 a clock.

Dr. Dr. Lee,—I am very sorry Y^{r} lameness continues; I hope You'll soon be able to come out again. Y^{r} lameness lam's us all, and I assure Y^{u} the Whole Party is cripl'd by it. Th' Affair of Bucks being o'er in the H^{se} of Comons, th'H^{se} of L^{ds} has beeing my great attention this Week, and I can tell Y^{u} with great Pleasure that matters are there in a great forwardness. L^{d} G^{ville}, Chestf., Bath, the old Opposing L^{ds}, and Severall of the Courtiers, will fight it. I dare say things will come nearer there than can be imagin'd. The C^{t} will have but the two S^{rys} of S^{te} and the Chanc. to Support the Bill, and how even he will dare do it, against all W^{ter} Hall, I can't conceive. Y^{r} brother, the Chief J^{c}, may aquire great Reputation on this occasion, and I dare say You'll keep up his Spirits. Pray put him in mind how nobly Hales and Holt stood in the Gapp, and how happy

'tis to live in such tim's, when Credit can be gain'd, and so easily. I am Sure he'll do well, and if he pleas's this Crisis may turn out greatly. I feel as a friend the great figure Yu have made last Week; Pham and his followers tremble now for Yu, and I thank Yu for the lead Yu took that day. Things are rip'ning, and our friends are gathering Strength, which is owing to the Prudent way of Yr going on; for which, and all Yr good Services, I am as allways very much oblig'd to Yu.

F. P.

7 a clock.

Dr. Dr. Lee,—I am confidently told that a Message will be sent next Week to the Hse of Comons, asking Advice, as I told Yu last night; I think th'only thing in that case we have to do is to avoide giving any, and to move for a Comittee to look into the State of the Nation, which will lead us into a grat Field, and load them Strongly. Be so good to dine Wednesday next with Ld Carlisle with me here; wee'll be alone, and talk o'er the matters of yesterday. I'll expect Yu at 4 a clock. Goodnight Dr Lee.

F. P.

I am sorry to hear Yu are not well; take care of Yr Self, for next Winter's Campain depends on Yr health. Maddin, by some Indiscretion, is, I'm afraid, in a good deal a danger; Pelham has offer'd a Silk Gown and his Protection to Jodrell, who Sais he'll drop this, and lay a considerable Sum down for us to come into Pment, if I'll give him the Promise of Sollc. My answer has been, I'dd consider, and Speak to Yu, who manage the Hse of Comons for me. Yu remember, Dr Dtr, he allready offered himSelf last Winter; his Fortune is a very great one, between 2 and 3000£ a Yr, one of the promisenst men of the Law; maybe it is an acquisition, and it Sav's a Man of the family. Consider it, and give me Yr opinion, which I allways like to follow. Henly may be had without it, I'm told. Adieu, don't go out to soon, and write to me where Yr Pains are, nurse it, and it'll do Yu good; if Yu have not Flannells enough, I'll Send 'em to Yu, but for God's Sake no quacking.

F. P.

Wednesday, 7 a clock *(October 11, 1749)*.

Dr. Dr. Lee,—I am sorry to hear Yu are not so well as I expected; pray stay a week longer, that may do the business. The Par——— will meet certainly the 16th, the impatience of the —— has carry'd it, against Pel——'s representations and promises that, notwithstanding its meeting after Ch——mas, it should be up at Easter. Dodl. has kiss'd hands, and is sufficiently abus'd by them for it, tho' their Orders for attendance is doubl'd since, and that they show great fears about it. I and my Family are, thank God, very well. I'll stay a week longer in the Country, which, joint to th'Exercise I take there, has fix'd my health for the Winter, I hope. Goodbye, Dr Lee, may Yr legs grow as good as Yr good heart and head.

FREDERIC P.

Under such intercourse, we cannot be surprised that Prince Frederic was highly esteemed by the Lees, nor that a fine equestrian statue was erected, in the spring of 1757, to his memory in Hartwell Park;* while, to hold a candle also towards the father, a figure of George the Second was placed upon a column on Park Hill, in front of the house.

The regard and confidence in which the worthy Doctor was also held by the Princess of Wales, may be judged by the style of her letters to him, several of which are in the Hartwell collection: the earliest (*October* 30*th*, 1749) is on a matter of importance, and in these terms—

Sir,—I was fully convinced of your attachement to the Prince, myself, and my Family, and that made me consult you upon the paper I ordered should be communicated to you; I esteemed you the properest Person to advise me on the occasion, as I have long since valued you upon the reputation of your understanding and Probity.

As I asked your advice in order to follow it, The paper shall be returned in the manner you approve of. The Prince, I believe, designs to see you next Sunday; and, as we go out of town to-morrow, I am concerned it is not in my power to have some conversation with you before you will speak to the Prince. The first opportunity I can have of a free conversation with you will be very agreable to me. The Prince seems serious to have the Education of His Family considered, and I wish and belive He will consult you alone upon this important subject; I make no dout but that you will enforce the necessity of placing proper Persons about The Children, and shew him the consequence of proposing unexceptionable men. You may easily believe how much I have at heart the proper Education of my Family; and, as I do not know any Person whose merit I have a higher opinion of than yours, I cannot justly place my confidence but in you, whose zeal for the Prince has been so constant and disinterested, and whose attachement for us and our Family I entirely am convinced of, and rely on. I shall therefore be glad to know your sentiments upon all occasions. You will please to consider of proper methods to facilitate the Prince's good intentions; and, as you will have an opportunity next Sunday to speak your sentiments, I depend that your attachement to us and our Family will dispose you to advise the Prince in the best and strongest manner on a point so essential as well to us as the whole Nation. I am, with great esteem,

AUGUSTA.

* There is also a fine portrait of this Prince of Wales in the breakfast-room, painted by Sir Joshua Reynolds.

Early in 1754, Sir George recommended Lord Hardwicke's son as a proper person to succeed her Royal Highness's Solicitor-General; a recommendation thus acknowledged by the princess:—

I am truly sensible, S[r] Geo. Lee, of your attachement to me, and shall always thinke it well whatever you suggest to me for my service. If a vacancy shonld happen, I will mention Mr. Charles York to the King. I am

Your affectionet

AUGUSTA.

and shortly afterwards came the following (10*th April*, 1754):—

As I can't have the pleasure at present of seeing you, I desire you will let Mr. Hendly know that I appoint him my attorney; and likewise to acquaint the Chancellor that I nominate Mr. York Solicitor, being glad to have it in my power to shew him a mark of my regard. The King, whom I have seen to-night, approves of them both. I remain your friend,

AUGUSTA.

This having been duly announced, Lord Hardwicke sent his warm acknowledgments on the following day, saying,—"Before I received the honour of your letter, I fully intended to have writ to you this forenoon to entreat your favour in recommending my son Charles to the Princess of Wales to succeed to the office of her Royal Highness's Solicitor-General, in case her Royal Highness should think fit to promote Mr. Henley to be her attorney. But the princess's uncommon goodness, which I can never sufficiently acknowledge, has prevented me, and changed the form of my request to you. Permit me now to beg that you will lay me at her Royal Highness's feet, and to assure her of the high and grateful sense which I shall ever retain of this mark of her favour to me and my family; and of the great honour which her Royal Highness has been pleas'd to confer upon my son by receiving him into her service in this gracious manner."

Such was Sir George Lee as a court-lawyer: but the highest point of his public excellence was undoubtedly in his eminent exercise of the civil law,

which may be appreciated by the few ecclesiastical cases, comparatively, published in 1833 by Dr. Phillimore, with Dr. John Lee's permission. In Admiralty matters he was thoroughly conversant, and constantly resorted to for his opinion thereon. Dr. Harris, in his dedication of the Institutes of Justinian, bears ample testimony to his genius and worth; and Dr. Phillimore remarks that his concise memoir of him would be imperfect, if it were closed without adverting to the part which Sir George Lee is reputed to have taken in framing the most celebrated State Paper of modern times, viz. the answer to the memorial of the King of Prussia, presented to the Duke of Newcastle by Mr. Mitchell. It bears date 8th of February, 1753, and is generally understood to have been the joint composition of Lee and Murray (afterwards Earl of Mansfield); and having been acknowledged throughout Europe as a masterly exposition of the nature and extent of the jurisdiction exercised over ships and cargoes of neutral powers, by courts of the law of nations established within the territories of belligerent states, it was generally adopted and received by eminent jurists of later times, as text authority on the subjects discussed. Montesquieu (*Lett. Persannes*, xlv.) characterises it as "résponse sans réplique." And this celebrated paper, be it remembered, was written in times when the moralist had not quite descended to the casuist, nor the statesman to the mere politician: nor had broad rules and fundamental principles as yet succumbed to little specialities and desperate expedients, suited only to the convenience of the hour, or the accommodation of a temporary party.

Sir George Lee was, as Lord Orford has recorded, of great parliamentary weight, and was persuasive by sound argument and flowing speech set off by a solemn harmonious voice, and a gravity of style which sometimes became severe. But no political avocations ever induced him to neglect his professional duties. During the whole time that he presided over the testamentary and matrimonial law of the country, he retained the same close habit of industry which had distinguished him at the bar; and throughout his whole career he maintained the admirable practice of inserting in note-books a statement of the particulars of every case, a summary of the arguments of counsel, and a

précis, as it were, of his own opinion. Many volumes of these jottings remain at Hartwell, authentic monuments of his indefatigable diligence: and, besides professional records, there are several specimens of his poetic taste, principally in Horatian paraphrases. In a versified letter to his brother, Sir William, secluded in "Totteridge Bowers," he contrasts the cares of town and courts with the peaceful pleasures of the country, where

> The sun of each revolving day
> Shines on you elegantly gay,
> Cheerful, easy, dégagé;
> And thus you pass each pleasing night,
> Sacred to friendship and delight,—
> Friendship, the truest bliss of life,
> The brightest lustre in a wife,
> That heightens joy and lessens grief,
> To all the pangs of life relief!

He married Judith, second daughter of Humphrey Morice, Esq. of London, who died 19th July, 1743, and was buried in the church at Hartwell; where fifteen years afterwards Sir George, who had munificently contributed to its re-erection, was also interred. He expired suddenly while sitting in his chair, at his house in St. James's Square, on the 18th of December, 1758. He resigned his breath, states the tablet to his memory at Hartwell, "with the following farewell to his surrounding attendants—'God bless you all.'" Leaving no children, he bequeathed his whole fortune to his nephew, Sir William Lee, the fourth baronet.

But a maritime writer must be excused for dwelling a moment longer on Sir George, as the civilian who cleared the tangles from the celebrated *Cabandonga*, Lord Anson's prize.* Among other cases of importance, he

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* Sir George appears to have been very popular among naval officers. When Lord Forrester pounced upon a quantity of "pieces of eight" in a Swedish ship in May, 1741, Sir George advised the eccentric peer to make up the matter with the claimer upon the best terms he could, for that he had no ground to stand upon.

conducted the cause of those rich vessels, the Lewis Erasmus and Marquis d'Antin, which were captured by the Duke and Prince Frederick privateers, in 1745: the decision of which gave the fortunate owners seven hundred thousand pounds to their share. A massive and elaborately decorated silver vase, on which the main portion of the engagement is shewn, was presented to Sir George by his grateful clients: and it now remains an honourable memento in the family. Its ornaments consist of embossed and chased naval and military emblems, with armorial bearings of the Lees; it is fourteen inches high by twenty in circumference, weighing 85 oz. 19 dwts., and the lid is surmounted by a large knob in the shape of a ship's poop-lanthorn. The action is represented in the following manner:—

Here I am constrained, on the principle that whatever is worth telling should be told truly, to criticise a passage relating to this identical vase in

Dr. Lipscomb's History of Buckinghamshire; and the more so, as he may, from the general merit of his work, be quoted as an authority hereafter. This gentleman (vol. ii. page 307) says, "The noble gift commemorates the determination of the fate of five privateers: the King George, Commodore and Commander George Walker; Prince Frederick, commanded by Edward Duffin; the Duke, by Robert Denham; the Princess Amelia, by Robert Riddle; and the Prince George, by Francis Davison." Now this appears sufficiently circumstantial, but is utterly without foundation; for the gallant privateers so exactly cited were not commissioned as "The Royal Family" till the signal success of those in the above action encouraged further adventure. The representation on the vase is faithful to the public descriptions of that transaction, both as to the number of ships, and their position in the battle; and to stamp the evidence undeniably, the initials of each vessel's name appears on the vase, over her masthead. In order to establish this allegation as a substantial fact, it may be as well to insert one of the accounts, say Entick's (*Naval History*, p. 805),—

Some merchants of London had fitted out three privateers, intended for a joint cruise, under the command of Captain Talbot, who was to act as the Commodore; with the Prince Frederic, of twenty-eight guns and two hundred and forty men; the Duke, Captain Morecock, of twenty guns and one hundred and fifty men; and the Prince George, of twenty guns and one hundred and thirty-four men. The squadron set sail from Cowes, in the Isle of Wight, on the 2nd of June; but on the 7th the Prince George unfortunately overset and sunk; and though the Commodore immediately went to her assistance, he could save no more than twenty men out of the one hundred and thirty-four However, not discouraged with so unfavourable a beginning, the Prince Frederic and the Duke continued their course off the coast of Portugal; but, meeting with no remarkable success, they steered for the Azores, or Western Islands, situate between 25° and 33° of west longitude, and between 36° and 40° of north latitude, being nine in number, and subject to the crown of Portugal. The two privateers, on the 20th of June, made the Isle of St. Mary, the southernmost of the Azores, when they stood away to the westward, to cruise between these islands and the great Bank of Newfoundland.

Their cruise was unsuccessful till the 10th of July, and then, between five and six in the morning, they discovered three sail bearing west; which happened to be the Marquis d'Antin, of four hundred and fifty tons, twenty-four guns, and sixty-eight men, commanded by Captain Magon Serpere; the Lewis Erasmus, of five hundred tons, twenty-eight guns, and sixty-six men, com-

manded by Captain Lavigne Lucnell; and the Notre Dame de Deliverance, of three hundred tons, twenty-two guns, and sixty men, commanded by Captain Pedro Litant; all three of them belonged to St. Maloes, and having been out four years in the South Seas, on the coasts of Chili and Peru, and now on their return, immensely rich, from Lima, in Peru. The two privateers bore down on the French, who made little account of them, and kept their wind; but a quarter past seven, Captain Talbot fired a gun at them, when the French hoisted their colours and formed a line. The Duke, being somewhat too hasty, went to windward, and immediately began to fire away; while Captain Talbot bore to leeward, and advanced within pistol-shot of the nearest ship to him, which was the Marquis d'Antin, where they entertained each other exceeding smartly for three hours, before the French submitted. During the time that the Prince Frederic was engaging the Marquis d'Antin, the Lewis Erasmus got on his bow, and put Captain Talbot between two fires; who, as soon as the first ship had struck, lost no time, but went and returned the visit to the Lewis Erasmus; at the same time that the Notre Dame de Deliverance crowded away from the Duke, who had orders to chase her, while Captain Talbot attacked the Lewis Erasmus, where he found such warm work that it was three hours before she would strike: though the Captain of the Duke, seeing night coming on, and apprehending that Captain Talbot would be puzzled to take care of the disabled ships, quitted the chase, and let the third make her escape. Captain Talbot all along conceived that his adversaries were Martinico ships, but was agreeably surprised to understand they were richly laden with the treasures of Peru and Chili; a treasure that might well repay him and his sailors for their trouble, though the Prince Frederic had one lieutenant and five men killed, and twenty-five wounded; the Duke had seven men killed and eight wounded; the Lewis Erasmus had only the Captain and one man killed, and four wounded; and the Marquis d'Antin had no more than the Captain and six men killed, and eight wounded; but this was owing to the English Captain firing more at their rigging than between the decks, for fear of sinking them. The prizes lost all their masts, and were obliged to be towed by the Prince Frederic and Duke to Kinsale, in Ireland, where they happily arrived on the 30th of July, when Captain Talbot found that the prizes had a treasure of two million six hundred and sixty-five thousand three hundred and fifteen dollars in specie; pistoles and doubloons to the value of three hundred thousand six hundred and ninety-three dollars; gold bars to the value of thirty-two thousand dollars; and wrought plate to the value of eleven thousand dollars: amounting in all to three million and nine thousand and eight dollars, being six hundred and seventy-seven thousand and twenty-six pounds, besides eight hundred tons of cocoa, and other valuable effects; which were conveyed by three men-of-war to Bristol, and conducted in forty-five waggons to the Tower of London; the whole weight of treasure, including the package, amounting to seventy-eight tons, thirteen hundred, one quarter and sixteen pounds; the proprietors having seven hundred thousand pounds to their share, and every common seaman being entitled to eight hundred and fifty pounds for his dividend.

The Notre Dame de Deliverance, that escaped from the Duke privateer, made the best of her way to Cape Briton, imagining the French had still possession of the island; where she was taken, the 20th of July, by the Sutherland and Chester, men-of-war, and carried into Louisburg, when she appeared as valuable a prize as either of her consorts; her cargo consisting of eighteen

serons of gold, weighing one thousand one hundred and seventy pounds averdupoise: fifteen thousand three hundred and ninety-nine double doubloons; one hundred and sixty-two gold snuff-boxes, weighing nine hundred and fifty-two ounces; one million and seventy-two thousand pieces of eight; seven hundred and sixty-four ounces of virgin silver; thirty-one pounds of silver ore; several diamond rings and solitairs; eight hundred and seventy-six serons of cocoa; two hundred and three serons of Jesuits' bark; one hundred and ninety-one tanned hides; one hundred and eighty-one dozen of fans; and twenty-six bales of Carmenian wool: the whole amounting to upwards of four hundred and sixty thousand pounds, which was safely conducted to Portsmouth under convoy of four men-of-war.

Dr. Lipscomb could neither have read this nor any other narrative of the capture of the Marquis d'Antin and Louis Erasme, or he would hardly have buckramized the two captors into five. The Prince Frederic and the Duke gallantly advanced in the face of three tall ships, taking two and putting the other to flight: and the whole was excellently conducted. The captains and crews of the privateers behaved with the greatest generosity to their prisoners, allowing them to keep all their private valuable effects; and when they put the fore-mast men ashore, they distributed twenty guineas to each. And as if to render the whole affair nationally creditable, the conduct of the owners was also equally noble; for, receiving their enormous share of seven hundred thousand pounds soon after the rebellion broke out, they made a voluntary tender of it as a loan to the government to prosecute the war; this was accepted, and an interest paid to the proprietors.

Such is the actual picture so travestied by Dr. Lipscomb, who concludes by assuring his readers that this testimonial is retained as an heir-loom by the Lee family, "as a trophy, not of the victory of arms, but of the triumph of justice and reason." Now it is rather difficult to understand this curious peroration. How far "justice and reason" stand up for such a deeply discreditable feature of warfare as privateering, is more a matter of law than principle; and in the case before us, the absurdity of the terms is strikingly evident. But it is easily shewn, and in Sir George's own autograph, that the case which drew the aforesaid silver vase was a very every-day affair, for which fees and "refreshing fees"—exclusive of proctors' and attorneys' pickings—were abund-

antly charged: a sample of them may bear out the remark; especially as these items are extracted after there had been more than a year's expenses in filing, settling libel of appeal, hearing alloñs and "further hearings," and all that—

Hilary term, 1747-8. LORDS. Feb. 18th. Marquis d'Antin, taken by the Prince Frederick and Duke. Fee for hearing. Crespigny proctor for captors and appellants. 10*l.* 10*s.*

Easter term, 1748. LORDS. May 4th. Marquis d'Antin, taken by the Prince Frederick and Duke. Fee for sentence. Crespigny proctor for the captors. 10*l.* 10*s.*

Easter term, 1748. LORDS. May 5th. Marquis d'Antin. Fee for a consultation. Crespigny proctor for the captors. 2*l.* 2*s.*

Trinity term, 1748. ADMIRALTY. June 24th. The Marquis d'Antin, taken by the Prince Frederick and Duke. Fee for hearing before the Lords, and for a consultation. Crespigny proctor for the captors. 12*l.* 12*s.*

Trinity term, 1748. LORDS. July 4th. Marquis d'Antin. Fee for further hearing. Crespigny proctor for the captors. 12*l.* 12*s.*

Same term. LORDS. July 5th. Similar entry. 10*l.* 10*s.*

And the Louis Erasme's dollars were pretty well sifted by the same process, while their unfortunate consort fared even worse; for, among the jottings there are fees and "refreshing fees" upon her also for a long time after her partners were condemned, owing to some contested claims by ships in sight at the capture. By thus despoiling truth of false ornament, as Alfieri has it—

Il ver dispoglia
D'ogni mentito fregio, il ver conosco;

and on weighing in words the agreement and disagreement of ideas between Lipscomb and myself on this point, the logical truth may be readily found by the propositions of Locke. This is the manner in which the charges for the consort run:—

Hilary term, 1749. LORDS. February 27th. Notre Dame de Delivrance. Fee for settling an act. Greenly proctor for the Sunderland and Chester. 3*l.* 3*s.* This was followed on the next

day by a fee of 10*l.* 10*s.* for a motion on said act; and another of 12*l.* 12*s.*, on the 5th of March, for a "further hearing."

Easter term, 1749. ADMIRALTY. May 3rd. Notre Dame de Delivrance. Fee to oppose an alloñ *(allegation).* Greenly proctor. 3*l.* 3*s.*

Trinity term, 1749. ADMIRALTY. Notre Dame de Delivrance. Fee for a consultation. Farrer for the captors. 2*l.* 2*s.*

Same term. June 15th. Refreshing fee for further hearing, 5*l.* 5*s.* And between that date and the 27th, three more "refreshers," each of the same amount.

Easter term, 1750. LORDS. May 1st. Notre Dame de Delivrance. Fee for settling the case, and for the hearing. Greenly proctor and Hamersley solicitor for the Sunderland and Chester men-of-war, the appellants. 21*l.*

Easter term, 1750. LORDS. May 14th. Notre Dame de Delivrance. Fee for further hearing. Greenly for the Chester and Sunderland, captors and appellants. 10*l.* 10*s.* And two days afterwards another hearing, 10*l.* 10*s.* May 30th, a "further hearing," 10*l.* 10*s.*; and further hearings in June, &c. &c.

Sir George was actually afterwards the advocate for "Commodore" Walker and his well-known group called the Royal Family privateers; the which are stated to have made above a million sterling, in their fortunate cruises. But, as a large portion thereof in specie and bullion was sent to the Bank of England and detained under conflicting allegations—where it actually still remains, invested in the name of the Accountant-General of the Court of Chancery,—we should like to know what "justice and reason" have had to do with it the while. Various attempts have been made to substantiate claims upon this property. Even so late as the 23rd of July, 1831, a reward of five guineas was offered in "The Times" newspaper to any person who could procure the log-books of the Royal Family privateers, or any or either of them, which sailed from the port of Bristol in 1746. Soon after this advertisement appeared, the solicitors for the claimants addressed Dr. Lee for information as to any papers or memoranda left by Sir George on the subject; mentioning that they had traced a log down to 1823, but were now utterly at fault.

So much for the abstract virtues of dancing the hey in a prize-court! But, having poured forth a tribute of respect and unfeigned admiration upon the career of those very eminent brothers, Sir William and Sir George, we will now return to Hartwell.

Sir Thomas Lee, the third Baronet, had succeeded to the title and estates on his father's death in 1702; and was highly esteemed as a landlord, magistrate, and general man of business in the neighbourhood, on which account his services were in constant requisition. He served in three parliaments for the county of Bucks, and in three others for the borough of Chipping Wycombe in a time of much local political fermentation. Among the letters before me is one from Lord Cobham, dated December 26th, 1727, rather coolly intimating his pleasure that Sir Thomas should declare himself a candidate for the county, but that the "little interest I have in it must follow the general disposition of the gentlemen and freeholders in supporting the old Whigg interest." Duke Wharton also followed on the same side: but he was more warmly greeted and treated by others, as, for example, the Earl of Lichfield—

Ditchley, Jan. 20th, 1728.

S^r^,

I rec^d^ your's this day, and I am sorry to have itt confirm'd by you, that you are likely to meet with an opposition in Buks, and by a person so little known. For my part, I never heard of him before, and I find he is not better known by any other gentlemen of the county that I have lately conversed with. I cannot think it much to the creditt of those persons that support him, and both hope, and don't doubt, that such an opposition will not be of any manner of consequence. But, however, I think you are extreamly right in makeing the uttmost application to all gentlemen in time, for by that I think you have no need to doubt of success.

I have wrote into Bucks to my steward there, to go to all my people and engage their votes for you, and my steward shall be there before the election, to meet them att my house, and bring them all in, as he has been used to do, and I will take care of all other people of my acquaintance. I have a brother with me now who is a freeholder, and shall be sure to be there. If this opposition continues, which I can hardly think possible, I should be glad to know when you think the election will be, for I suppose the writt will be moved for and ordered to morrow, so that I should hope itt will come on soon.

I have received answers to both my letters to S^r^ W^m^ Stapleton and the Duke of Bedford, with promise of their interest. I am, with the utmost sincerity, S^r^,

Your most obedient humble serv^t^,

LITCHFIELD.

He married Elizabeth, daughter and heiress of Thomas Sandys, Esq. of London,

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by whom he had issue two sons and a daughter: namely, 1. Anne, who in 1741 married George Venables Vernon, Esq. afterwards created Lord Vernon of Kinderton, and died *s. p.* within a year. 2. Thomas, who died before his father at the early age of eighteen; and 3. William, his successor, who inherited the property and honours as fourth Baronet in the year 1749.

Sir William was completely what is termed "a man of business," and his management of the farms and farming buildings has been followed by lasting benefit to the property. He has already been mentioned as the builder of the church on its present elegant plan; and he displayed great taste in planting and laying out the grounds, so that, while they were not strictly Brunonian, they yet kept pace with the reforms then in almost universal adoption. The mansion-house—which had been erected partly by Sir Thomas Lee and partly by his son, Thomas Lee, Esq. at the latter end of Queen Elizabeth's reign and the beginning of James the First's—was now greatly enlarged; the south and east fronts finished in what was termed, by rather a free licence, the Greek style; and the interior arrangements were greatly altered. These fronts are shown on the annexed plate *(plate IV.)*; but the low projecting portion with a cupola is the observatory recently added, which will be presently spoken of. The heavy pargetted pedimental gables of the old northern front were removed, and the whole roof and parapet brought into harmony.

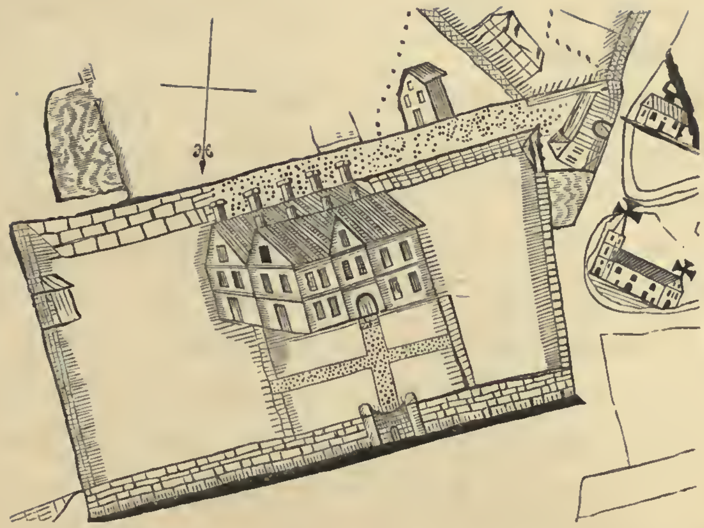
Here I am compelled to return for a moment to Dr. Lipscomb's County History; for, although the criticism of a work of such labour and information forms no part of my object, yet where a direct statement appears under such authority, it is likely to perpetuate error unless pointed out. The Doctor (vol. ii. page 327) gives a vignette of the old mansion, before the alterations made by Sir Thomas Lee, said to be "from an ancient map or plan surveyed by John and William Brudenell, surveyors, in 1661." Now if this were worth preserving at all, his engraving ought to have been a scrupulously faithful fac-simile of the wretched drawing itself, which it assuredly is not; and I therefore submit a true one,—the only liberty taken being the reversion of its meridian.

Plate IV.

Hartwell House & Observatory. (from the South.)
(Morning.)

J. Basire. Sc.

Hartwell House & Observatory. (from the North.)
(Evening.)



I am, moreover, at a loss to conceive on what grounds this was assumed to have been a correct representation of Hartwell House; for we only need look at the deformed angels around the title of the original, the *bizarre* crosses on the church, the disproportioned cottages, and other palpable as well as internal evidences, to see that the Messrs. Brudenell were no great masters of their craft: and indeed they have actually placed the north of their compass where the south should be! The "plott" is not even a passable specimen of the talent of its day; and when this "ancient" drawing of a house was made in 1661, by some incompetent hand merely to decorate the plan, the following front, from a still older representation in Dr. Lee's possession, might have

been copied by them had they possessed skill enough: moreover the original itself was before their eyes.

On the 20th of June, 1763, Sir William Lee married the Right Hon. Lady Elizabeth Harcourt, only daughter of Simon Earl Harcourt, by whom he had two sons, William, his successor, and George; and one daughter, Elizabeth, who died in her infancy. Lady Elizabeth was a highly accomplished and very amiable person, and her memory was long held in the grateful recollection of the neighbourhood.* She was born on the 18th of January, 1738, and was one of ten young ladies, daughters of Dukes and Earls, who supported the train of Queen Charlotte at her nuptials in 1761. Her father was unfortunately drowned in a well, while endeavouring to save the life of a favourite dog which had fallen into it: he made the improvements in his grounds celebrated by Whitehead in the poem commencing—

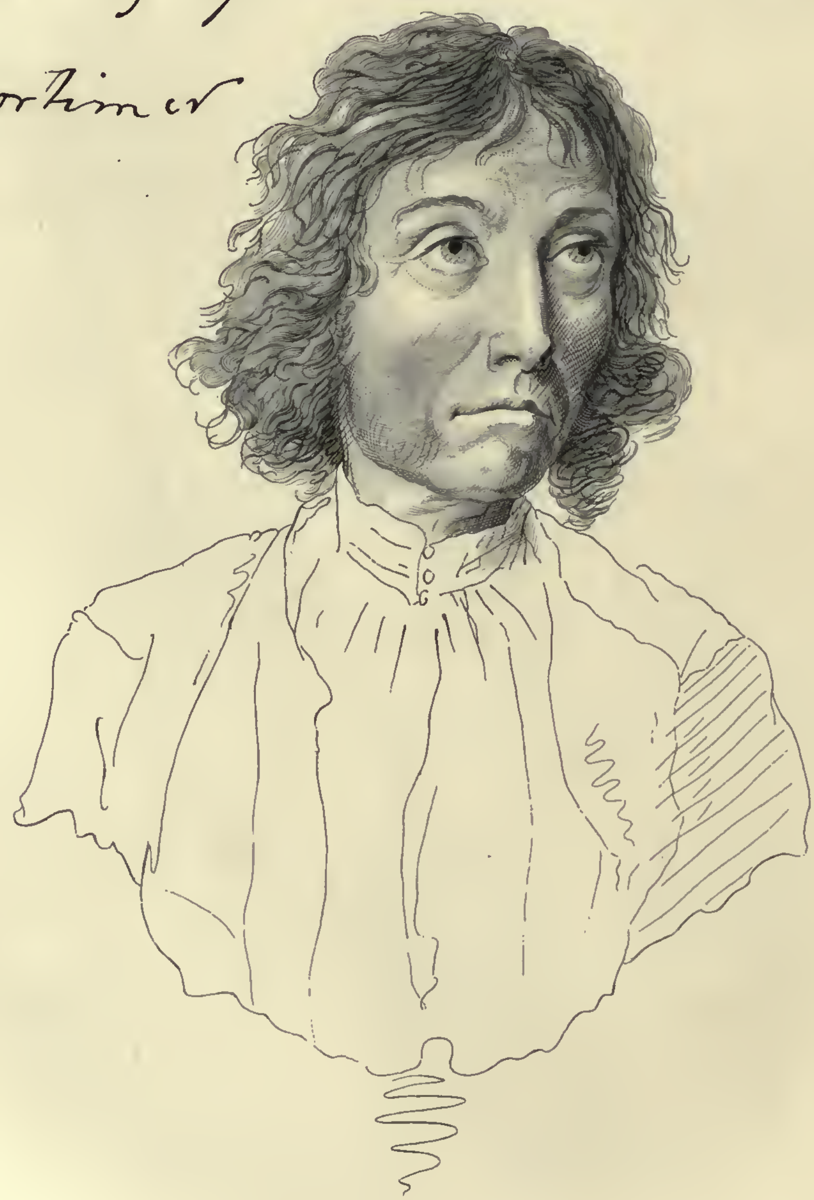
Dame Nature, the Goddess, one very bright day,
In strolling through Nuneham met Brown in her way:
"And bless me," she said, with an insolent sneer,
"I wonder that fellow will dare to come here.
What more than I *did* has your impudence plann'd?
The lawn, wood, and water, are all of my hand;" &c.

There are still remaining at Hartwell various specimens of Lady Elizabeth's acquirements; and among her drawings is the portrait of Dame Mules—an old woman who inhabited the Swiss cottage in the park—also a reduction of the large picture of Sir John Suckling; and I have given a wood-engraving from her view of Hartwell Church at page 13. Indeed, both Sir William and herself seem to have been equally partial to the fine arts; Whitehead the Laureate and Mason the poet were treated with intimacy, and among other

* Sir Alexander Croke, on visiting Hartwell in September, 1830, jocosely remarked that he had often scorched his fingers at the fire-place before him, toasting bread and muffins, as Lady Elizabeth always insisted on the party present "cooking" for themselves. Such was also the custom at the well-known public breakfasts of Sir Joseph Banks.

John Saxby Labourer in Sir Tho: Lee's
Garden and Clerk of Hartwell parish
1730 & after

By Mortimer



men of talent of that day they appear to have been very friendly to the meritorious J. H. Mortimer, when he resided at Aylesbury. Among several excellent sketches of employés in the household by that artist, with their names and stations subjoined in Sir William Lee's autograph, one, a portrait of John Saxby,* struck me as such an impersonation of Swift's immortal P. P. "of this parish," that I could not but have a fac-simile engraven. *(Plate V.)*

Besides drawing and ornamental work, Lady Elizabeth was fond of her flower-garden, and indulged in poetry: some verses are already cited at page 42, and another specimen, written in a bower at St. Leonard's Hill, may be given in evidence:—

This peaceful shade, this green-roof'd bower,
  Great Maker! all are full of thee;
Thine is the bloom that decks the flower,
  And thine the fruit that bends the tree.

As much creative goodness charms,
  In these low shrubs that humble creep,
As in the oak, whose giant arms
  Wave in the high romantic steep.

The bow'r, the shade, retir'd, serene,
  The peaceful heart may much affect—
There God in every leaf is seen,
  And man has leisure to reflect.

Her Ladyship's brother, the Earl of Harcourt, was also a man of taste and research; and a letter to Sir William is illustrative of his spirit of inquiry:—

"One is very apt to suppose that others have the same tastes with one's self. And therefore as I took great pains to learn through what families the Manor of Nuneham Courtenay

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* The name of Saxby no longer exists in the neighbourhood; but it had been long known on the estate. In the "plot" of 1661, already quoted, "Saxbies House" stands in an enclosure of one acre, two roods, and twenty-seven poles.

had passed, previous to its coming by purchase into mine, I naturally conclude that you will not be sorry to receive the enclosed particular and authentic account of Hartwell, by which you will see two circumstances not very common,—the one that it has been honoured by a royal visit, and the other, that it has regularly descended to you through heiresses, from the remote time of its first possessor, who I suppose obtained it at the Conquest. Whether these particulars be or be not unknown to you, you will, I am certain, excuse the trouble of this communication, for the motive that gave rise to it. Pray give my love to my sister, and accept that of Lady Harcourt united with mine to yourself."

To this Sir William—under the assumed signature of *William de Hertewell*—replied in the following terms, on the 24th of May, 1787:—

Dear Lord Harcourt,—I am doubly obliged to you, for the pleasure of hearing from you, and for reviving the pleasing study of the History of Hartwell. Your anecdote of the royal visit to Sir Alexander, and the compliment annexed, is quite new to me, and was very flattering; the rest of your account agrees nearly with one in my possession, the compilation of B. Willis; but this makes no mention of Edmund or his daughters, and states only that Sir A. leaving no issue surviving, his sister, Eleanor, daughter of Michael Hampden, married to Sir T. Lee, of Moreton, became heiress to her father and brother. I think your account of Edmund's daughter is erroneous; for, Maria, daughter of Edmund, dyed in 1578, as appears by record, and had sepulture at Hartwell. You trace the possession I believe correctly to William de Hertewell; from him the ascent is through several of like style to John Earl of Moreton—afterwards King of England, Henry II.—to the Peverels, descendants of the Conqueror, to Aveline a Thane of King Edward's the Confessor," &c.

The document here alluded to has been printed, but I regret having been unable to find the original. Still the following maxims, apparently copied by him from an old morality-scheme, may be illustrative of his Lordship's bent:—

Table Observations.

Picke Make Maintaine	no	Quarrels. Comparisons. Opinions.
Report Repeat Reveale	no	Sad newes. Grievances. Secrets.

Tell Take Touch	no	Long tales. Tobacco. State matters.
Laie Urge Use	no	Wagers. Healthes. Long meales.

Odi memorem compotatorem.

Sir William Lee died on the 6th of July, 1799, and was succeeded by his eldest son, William, the fifth Baronet, who pursued a military life, and became Lieutenant-Colonel of the 16th or Queen's regiment of Light Dragoons, commanded by his uncle, Earl Harcourt. In that regiment Sir William Lee served several campaigns in Germany, during the late wars, with great credit; and afterwards exchanging into the 25th regiment of Light Dragoons, he went in May, 1800, to join that corps at Madras, where he died unmarried on the 7th of February, 1801.

He was succeeded by his brother, Sir George Lee, the sixth Baronet, who, having originally been destined for a physician, had applied himself with zeal and assiduity to the study of medicine both in London and Edinburgh. In the year 1792, however, he entered into holy orders, and was presented by his father to the rectory of Hartwell and vicarage of Stone; which preferments he vacated in 1803 for the rectory of South Repps, in the county of Norfolk. From thence he removed to the rectory of Water Stratford, in the county of Bucks, which he resigned on being presented to the rectory of Beachampton, in the same county, by the late Marquess of Buckingham, in the year 1815. Sir George died at this living on the 27th of September, 1827, having for some years divided his residence between Beachampton and Hartwell; and in him the male line of the first Baronet, and consequently the Baronetcy, became extinct. Sir George Lee was never married; but he employed the leisure afforded by a single life, the gifts of fortune, and cultivated intellectual powers, in the discharge of his professional duties, and in active beneficence

to his neighbourhood. Discerning and upright as a magistrate, his judgment was always revered, and he was greatly beloved by his tenantry. In short, perhaps the character of this amiable gentleman cannot be better told than in the words of Sir William Young, Bart.—the historian of Athens, and M.P. for Buckingham—who tenanted Hartwell House for a few years, previous to 1807, during which the calamity below alluded to (*verse* 5) happened; he was afterwards appointed Governor of the beautiful island of Tobago. The following lines were written there by the *ci-devant* tenant, in April, 1814, and transmitted to England:—

1.

If aught cou'd the comforts of HOME e'er restore,
HARTWELL'S Manor, and Farm, with the care of the Poor
    Open'd grateful delights to my view:
But what most engag'd me, the Tenant to be:—
Was, the "Landlord;"—the good and belov'd SIR GEORGE LEE,
    Whom, as Justice, and Rector, I knew.

2.

Descendant of Hampden,—a younger son born,
His heirdom to Hartwell seem'd weak and forlorn;
    GEORGE LEE a PHYSICIAN was bred:
Hartwell's RECTORY vacate,—the PRIEST he became,
His Brother then dying,—was Heir to the same,
    And Parishioners "CUR'D,—TAUGHT,—and FED."

3.

Here my Children at home: a home's comfort I felt;
The Gentry were social, who near the place dwelt;
    And my Rector wou'd oft pass a day!
My Yeomanry drill; and the Sports of the field,
Some mornings each week, an amusement wou'd yield;
    And a Party to dinner wou'd stay.

4.

The poor man each morn had his hour of plea
For relief or redress, from Sir George or from Me.
    The Justices Saturdays met;

Overseers and way-wardens to hear and direct,
And wood-stealers, poachers, and vagrants, correct—
Their Worships a worthy and pleasant old set.

5.

Some years were thus busily, happily past,
And I thought, as I hoped, that life's course would so last,
When sudden—on one hapless day—
A calamity happened so grievous, that yet,
'Twere painful to write, tho' I cannot forget,
What from Hartwell then forc'd us away.

6.

King Louis of France, then taking my lease,
To Hartwell retir'd, 'till France was at peace,
To its *poor* good and kind as could be:
And himself gain'd a growing esteem for our nation,
And for this—without any, the least adulation—
'Twas enough to have known Sir George Lee.

Sir George Lee having, as above shewn, died without issue, the title expired: but by his own holograph will he bequeathed the mansion, furniture, books, pictures, plate, wines, and estates to the next heir male in blood, the present Lord of the Manor, Dr. John Lee, LL.D., a Member of the College of Advocates, and Fellow of the Royal, the Antiquarian, the Astronomical, the Geographical, and various other learned and scientific societies. The Doctor, indeed, is the representative of both branches of the Lee family, and is seized of the estates of Hartwell, Totteridge in Middlesex, and Colworth in Bedfordshire: and, although I am determined to advance nothing in this sketch that could be misconstrued into mere panegyric, yet justice to facts imperatively demands that the family summary should not be closed without a word or two upon the conduct of this gentleman. In this I shall necessarily be brief; and I can, of my own personal knowledge, declare to the substantial truth of all that shall be stated.

On his accession, Dr. Lee made no alteration whatever in the establish-

ment, retaining the tenants, followers, servants, and even animals, of his predecessor: but he commenced the required work of repairing cottages, improving grounds, portioning allotments, and looking generally to everything except game; insomuch that in no parish are the labourers better off than in Hartwell. Economical and prudent in his private expenses, he is yet liberal enough in his expenditure upon objects and ends of public utility; in which spirit he patronises every charitable, literary, and moral institution of a generous tendency, steering equally clear of exclusiveness, intolerance, and bigotry. But his grandest exploit in the cause of suffering humanity is unquestionably the establishment of the County Infirmary, of which benevolent institution he must be truly called the FOUNDER, without any disparagement to his excellent colleagues. Most truly did Dr. Johnson observe—but the apophthegm is not quoted as uttering the absolute truth—"Though many men are nominally intrusted with the administration of hospitals and other public institutions, almost all the good is done by one man, by whom the rest are driven on; owing to confidence in him and indolence in them."

Dr. Lee had for some years witnessed the beneficial working of that noble establishment, the Bedford Infirmary, under the able superintendence of my late friend, the amiable Dr. Joseph Thackeray, really one of nature's best men. On succeeding to Hartwell, and finding the county was destitute of so unequivocal a stamp of Christian benevolence, he bestirred himself with untiring activity in canvassing far and wide. From personal visitation to the hovels of the sick and maimed, he could well set forth and describe the direful consequences of protracted disease and accident among cottagers and the poorer classes, whose maladies are aggravated by the want of regular attendance, befitting treatment, and nutritious diet; and he earnestly represented the helplessness of their condition when, with other sad results of poverty, it was coupled with incapacity for labour or other employment. This great object seemed to be more appropriately his aim, inasmuch as his two predecessors—Sir William Lee and his son Sir George—were eminently beneficial to the distressed of their neighbourhood, in assisting them with sound

medical advice, and supplying them with drugs: and the cures performed by them are still remembered.

After well beating the bush, a formal public call was made on the 19th of October, 1830, and so promptly responded to by the nobility, clergy, and gentry of all classes, that the Buckinghamshire Infirmary was opened amid universal plaudits on the 11th of September, 1833. In the mean time, the worthy Doctor had purchased an eligible property situate at the angle of the two roads leading out of Aylesbury to Buckingham and Bicester, with the express object of securing it as the most eligible site for the proposed institution; and it was very thankfully re-purchased from him when the Committee of Management were able to act. Besides his general exertions, he made the munificent donation of one thousand guineas to the Infirmary, with other small sums, and a contribution of five guineas per annum.*

Under such fostering treatment the Buckinghamshire Infirmary struck root, and has proved a substantial blessing to the neighbourhood. It spreads thirty-six beds; and, on an average of several years, relieves annually upwards of one hundred and forty in-patients, and four hundred out-patients, under a care and administration universally approved of. This is the front of the building—

Before quitting the Infirmary, I should mention the excellent Dietary which has been drawn up for general observance there; and as it may, perchance,

* I feel some little pleasure in recollecting that I presented the first bedstead to this excellent establishment. It is of iron, and principally sent as a model.

meet the eye of some of those over-fed idlers who groan under dyspepsia, I here insert it as an antidote:—

	Full Diet.	Half Diet.	Milk Diet.	Low Diet.
BREAKFAST at Seven in the morning from the 25th March to the 29th Sept.; at Eight from the 29 Sept. to the 25 March.	One Pint of Milk Porridge, or Broth.	One Pint of Milk Porridge, or Broth.	One Pint of Milk Porridge.	Gruel, as required.
DINNER at Twelve o'Clock daily.	Four Ounces of Meat, one Pint of Broth, and Vegetables at discretion.	Two Ounces of Meat, one Pint of Broth, and Vegetables at discretion.	One Pint of thickened Milk.	Gruel, Bread Pudding, or Rice Pudding, as required; Vegetables at discretion.
SUPPER at Six o'Clock.	Two Ounces of Cheese, or one Ounce of Butter, on Wednesdays and Saturdays, for the Week's consumption.	Two Ounces of Cheese, or one Ounce of Butter, on Wednesdays and Saturdays, for the Week's consumption.	One Pint of Milk.	One Ounce of Butter on Wednesdays and Saturdays, for the Week's consumption, if required.
	Fourteen Ounces of Bread daily.	Fourteen Ounces of Bread daily.	Seven Ounces of Bread daily.	Bread as required.

The Allowances of Meat are weighed from Joints after they have been dressed: and consist of Mutton and Beef boiled. Roasted Meat when expressly ordered. The Broth is made from the whole quantity of Meat used, with Vegetables.

All Patients on Admission into the Infirmary are put on Half Diet, unless ordered to the contrary; and any subsequent alteration is allowed only by the advice of the attendant Physician or Surgeon.

Patients are expressly forbidden from making use of other Liquors or Provisions (Tea and Sugar excepted) than such as are ordered for them or allowed by the Medical Officers of the Infirmary; and if Patients or their Friends shall violate this Rule, such Persons shall be forthwith excluded from the Infirmary.

Patients are enjoined to preserve the strictest Regularity, Decorum, and Cleanliness at their Meals; and the Nurses will be held responsible for the due observance of these various Rules.

By Order of the Committee,

(Signed) HARRY VERNEY, Chairman.

General Infirmary, Aylesbury, Nov. 4, 1833.

To return to the Lees. Hitherto the course of this family's descent has been based on a chain of positive facts; but, before we trace the consanguinity marked by heraldic bearings, some degree of inferential testimony must be admitted. This very numerous family is to be distinctly followed in our early archives—as that of Domesday, the Inquisitions, Valuations, Rotuli, and the curious record of royal rights intituled the Testa de Neville; from all of which excerpta have been made and compared. As before stated, the Leghs or Lees were all-powerful in Cheshire, as those of High Lee, of Lyme, of Ridge, of Begulegh, of Adlington, of Twemlow, and of Booths; but the branching off of the several casts into other counties, was under circumstances the particulars of which are now, perhaps, unattainable. Yet there is evidence that the Lees of Morton withdrew into Buckinghamshire in the early part of Henry the Fourth's reign, to avoid the persecution to which they were liable in consequence of their manifested attachment to the cause of the unhappy Richard the Second. The men of Cheshire were devoted to that monarch—the self-styled *Princeps Cestriæ*—as his crafty successor well knew; and no fewer than two hundred of their knights and squires lay dead upon the ensanguined field at Shrewsbury. Still it is shewn that, when Henry of Lancaster marched against Chester, the *nidus* of the Royalists, Sir Robert and Sir John a Legh were dispatched with a deputation to meet him, and surrender everything; and the family must have considered their safety as thereby guaranteed. But no sooner was the usurper in safe possession of the castle, than he ordered Perkin a Legh to be forthwith beheaded, and his head placed upon one of the loftiest towers of the city. This summary act excited great commiseration for the veteran warrior, whose father-in-law, Sir Piers a Legh, had received the lordship of Lyme from King Edward the Third, for taking the Count of Tankerville, Chamberlain of France, prisoner at Crecy, and bravely relieving the banner of the Black Prince.

An inscription which was placed to the memory of Perkin in an oratory belonging to the Lees of Lyme in Macclesfield church, at once briefly records the cause of his doom, and intimates that he fell a victim to treachery. This epitaph has been copied by Camden, Browne Willis, Lysons, and others; but,

as they all differ in a slight degree from one another, I took advantage of my son, Charles Piazzi, returning to Edinburgh in October, 1850, and stopping at Macclesfield, to procure me a rubbing from the brass itself. This has enabled me to present a faithful copy:—

HERE LYETH THE BODIE OF PERKIN A LEGH
THAT FOR KING RICHARD THE DEATH DID DIE,
BETRAYED FOR RIGHTEOVSNES
AND THE BONES OF SIR PEERS HIS SONNE
THAT WITH KING HENRIE THE FIFT DID WONNE*
IN PARIS.
THIS PERKIN SERVD KING EDWARD THE THIRD, AND THE BLACK PRINC HIS SONNE IN ALL THEIR WARRES IN FRANCE AND WAS AT THE BATTELL OF CRESSIE AND HADD LYME GIVEN HIM† FOR THAT SERVICE: AND AFTER THEIR DEATHES SERVED KING RICHARD THE SECOND, AND LEFT HIM NOT IN HIS TROVBLES, BVT WAS TAKEN WITH HIM, AND BEHEADED ATT CHESTER BY KING HENRIE THE FOVRTH, AND THE SAYD SIR PEERS HIS SONNE SERVED KING HENRIE THE FIFT,
AND WAS SLAINE ATT THE BATTELL OF AGENCOVRT.
IN THEIR MEMORIE SIR PETER LEGH OF LYME, KNIGHT, DESCENDED FROM THEM, FYNDING THE SAYD OVLD VERSES WRITTEN VPPON A STONE IN THIS CHAPPELL, DID REEDIFIE THIS PLACE AN° D'NI 1620.

Another branch of the Cheshire main, which held Lee Engleys and Lee Frauncevs, in Lancashire, sold the then unimportant manor of Liverpool to King John: they seem afterwards to have domiciliated as *Der Edlen am Lee* in the baillages of Kyburg and Gruningen, in the territory of Zurich, where they are now extinct, or sunk into the class of peasantry.

Macclesfield church, notwithstanding parts of its body are both modern and *bizarre*, is a goodly old pile, with the date 1218 over the great tower door.

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* This word *wonne*, from the Saxon punan and German *wohnen*, to dwell, is not yet, I am informed, entirely out of use in that part of the kingdom. Perhaps a recollection of the epitaph induced Lady Elizabeth Lee to use the word in her stanzas on the Shepherd's Bower. (See page 42.)

† This must be an oversight, for Lyme was not bestowed for his *own* service at Crecy *(see ante)*, where he must have been a mere boy. The battle of Crecy was fought in 1346, and the decapitation of Perkin was perpetrated in the year 1399.

There are various monuments of the Lees and the Savages; of which a remarkable one commemorates a Roger Lee (*ob.* 1506), with his wife Elizabetha (*ob.* 1489); and there are kneeling behind them thirteen children. Between the figures is a plate whereon appears a mitred priest, perhaps Archbishop Savage himself, at his prayers, and under him an inscription which is defectively given in Gibson's Camden. In itself it is curious and exact as far as it goes, but the price of so comfortable a remission of torment which it pronounces, should have been added:—"The pdon for saying of v. paternost and v. aves and a cred is xxvi. thousand yeres and xxvi. dayes of pardon." It is on a wall of what is called Earl Rivers's Chapel; and there are in it recumbent figures of some of the Savage family.*

In the south-east angle of the body of the church is a more modern epitaph on a William Lee, setting forth that he was a master of great erudition in the school of King Edward the Sixth, (it was actually founded by Sir John Percivale in 1502,) in Macclesfield; that he "sweated" therein for forty-three years, and sent many pupils to either university; that he taught Hebrew, Greek, and Roman; that he knew French, Spanish, and Italian; and that he died in 1630, at the age of seventy-four. This is recorded in Latin, Greek, and Hebrew; and it is, moreover, shewn, that William Lee was a person of peace, a lover of concord, and preferred to suffer meekly than resent violently.

The close recurrence of such names as Macclesfield, Rivers, and Savage, cannot but strongly recall the startling and deeply-interesting narrative of Dr. Johnson. It must, however, remain a matter of wonder, how so sturdy a moralist could have been induced to varnish and vamp so profligate a character as his warm-hearted *Fidus Achates* undoubtedly was.

The genealogical Pedigree-Tables of Hampden, Ingoldsby, Lee, Beke, Antonie, and Fiott, from which the Doctor's descent is derived, are severally inserted in Lipscomb's History of the County of Buckinghamshire, where the

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* Elizabeth, daughter of Sir John Savage, knt. was married to Sir John Hampden, who was High Sheriff of Bucks in 1528. On a slab near the middle of the chancel of the church of Great Hampden, she is placed on the right hand of Sir John, and between them are the figures of three daughters.

inquiring antiquary can consult them; but as a convenient general reference, I have here drawn up for the main stock

A GENEALOGICAL TABLE

OF THE FAMILY OF LEE, OF HARTWELL,

FROM THE JUNCTION OF THE HOUSES OF HAMPDEN AND LEE.

Sir THOMAS LEE, Knt. of East Claydon and Morton; married 1570; died 1626. = ELEANOR HAMPDEN, dau. and eventually heiress of Michael Hampden, of Hartwell; born 1554; died 1633.

THOMAS LEE, of Morton and Hartwell; born 1573; high sheriff 1629; died 1641. = JANE, dau. of Sir James Throckmorton, of Fulbrook; died in 1642.
MICHAEL LEE.
And twenty-two other children.

MARY, dau. of George Dowse, Esq. of Sparsholt, Hants, widow of Sir N. Fuller; *ob. s. p.* = THOMAS LEE, only son, buried in Hartwell church, 1st September, 1643. = ELIZABETH, dau. of Sir George Croke, one of the Judges of the King's Bench; married 1633; and re-married to Sir Richard Ingoldsby, K.B.; died 1675.

Sir THOMAS LEE, K.B.; born 1635; created Bart. 1660; died 1690; buried at Hartwell; served in several parliaments, and was one of the Lords Commissioners of the Admiralty. = ANNE, dau. and heiress of Sir John Davis, of Pangbourne, by Anne, dau. of Sir John Suckling, the poet; died 1708.
WILLIAM LEE, died *cœl.* in Turkey of the plague.
GEORGE LEE, died 1679.
SAMUEL LEE, born 1639.
MARY, married to Sir John Morley, of Bere Court, near Reading.

Sir THOMAS LEE, 2nd Bart. born 1661 at Hartwell, where he was buried in 1702; M.P. for Aylesbury in several parliaments. = ALICE, dau. and coheir of Thomas Hopkins, Esq. of London; died 1728.
JOHN LEE, bapt. 1666, *viv.* 1690; a captain in the army.
LIONEL LEE, born 1674; *ob. s. p.*
FRANCES, *viv.* 1707.
JANE, born 1672; *ob. innupta* 1738.
ANNE, twice marr.; *ob. ante* 1707.
MARTHA, mar. John Padmore, Esq.; *ob.* 1721.
MARY, *ob. innupt.* 1749.
ELIZABETH, born 1662, mar. to Col. Ric. Beke; *ob. vidua* 1737.

Sir THOMAS LEE, 3rd Bart. born 1687; served in several parliaments; died 1749. = ELIZABETH, da. of Thos. Sandys, of London; d. 1728.
ANNE, dau. of —— Goodwin, of Bury St. Edmund's; died 1729. = Right Hon. Sir WILLIAM LEE, Knt.; bo. 1688; M.P. Lord Chief Justice, Privy Councillor; died 1754. = MARGARET, d. of Roger Drake, Esq. and relict of Fr. Melmoth; died 1752, *s. p.*
Younger dau. of Sir Thomas Hardy, *ob. in puerp.* 1740. = JOHN LEE, bo. 1695; Col. in the Guards; ob. 1760. = MARY, d. of John Browne, Esq. of Arlesey, Beds.
Rt. Hon. Sir GEORGE LEE, LL.D. Dean and Chief Judge of the Court of Arches, M.P. and Lord of the Admiralty; died 1758, *s. p.* = JUDITH, dau. of Humphrey Morrice, of London, *ob.* 1743.
SARAH, bur. at Hartwell, 1693.

THOMAS LEE, bo. 1722; *ob. s. p.* 1740.
Sir WILLIAM LEE, 4th Bart.; born 1726; *ob.* 1799, æt. 72. = ELIZABETH, dau. of Simon, Earl Harcourt; born 1739; ma. 1763; died 1811.
ANNE, born 1721, mar. to G. V. Vernon, Esq. created Lord Vernon; d. 1742, *s. p.*
WILLIAM LEE, of Totteridge Park, Herts; *ob.* 1778. = PHILADELPHIA, dau. of Sir Thomas Dyke, Bart. of Lullingstone Castle; *ob.* 1799.
THOMAS LEE, Equerry to H.R.H. the Duke of Gloucester; *ob.* 1814 *cœlebs.*
JOHN LEE, an Ensign in the Guards; *ob. ante* 1802.

Sir WILLIAM LEE, 5th Bart.; born 1764; Col. 16th Light Dragoons; ob. 1801, at Madras *cœlebs.*
Rev. Sir GEORGE LEE, 6th Bart.; born 1767; M.A. Oxon., Vicar of Stone and Rector of Hartwell and Beachampton; *ob.* 1827 *cœl.*
ELIZABETH, only dau.; born 1765; d. 1767.
WILLIAM LEE, Esq. took the name of Antonie, of Colworth, in Beds.; served in several parliaments; died Sept. 1825.
PHILADELPHIA, *ob. innupt.*
HARRIET, bo. 1763; ma. 1782; *ob.* 1795; buried at Totteridge. = JOHN FIOTT, Esq. merchant, of London, fourth son of Nicholas Fiott, Esq. lord of the fee and seigniory of Melesches, in Jersey; b. at St. Helier's, 1749; died at Bath 27th Jan. 1797; buried at Totteridge, co. Herts.
LOUISA, mar. to Edward Arrowsmith, Esq. of Totteridge; d. June, 1840.
SOPHIA, *ob. innupt.*

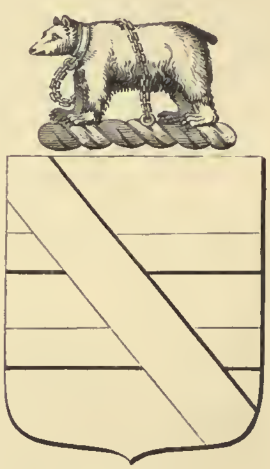
JOHN FIOTT, eldest son and heir; born 28 April, 1783; late Fellow of St. John's, Cambridge, and Trav. Bach. of that University, LL.D., F.R.S., &c.; took the name of Lee only, by royal mandate, 4th October, 1815, in compliance with an injunction contained in the last will of his maternal uncle William Lee Antonie, of Colworth House, Beds. devisee of Sir George Lee, Bart. = CECILIA RUTTER, born at Lymington, co. Hants.; mar. at St. Bennet's, Doctors' Commons, 25th Oct. 1833.
WILLIAM EDWARD FIOTT, bo. 28th July, 1786; a Lt. R.N.; died 6th May, 1849, *cœlebs.*
EDWARD FIOTT, b. 12 Jan. 1791; Lieut. in the Madras Army; *ob.* 18 Nov. 1824.
NICHOLAS FIOTT, b. 5th June 1794; late Fellow of St. John's Cambridge, M.A. = HARRIET JENNER, dau. of Sir Percival Hart Dyke, Bart. of Lullingstone Castle, co. Kent; ma. June 11th 1835.
PHILADELPHIA, born 10th May, 1784; mar. to John Ede, Esq. merchant, of London.
HARRIET, born 5th June, 1785; *ob.* 6th Feb. 1841, *innupt.*
LOUISA, born 6th Oct. 1787; *ob. innupt.* 1 March, 1832.
SOPHIA, b. 6 Oct. 1789; d. in Nov. 1795.
SARAH-ANNE, born 27th Oct. 1792; died in Feb. 1794.

From what is now placed before him, the reader will perceive that the Hartwell Family have continued in undisputed enjoyment of the inheritance, through an uninterrupted succession of their posterity, from about the year 1268 to the present time. Hence Browne Willis, in the before-mentioned manuscript written a century and a quarter ago, observed—"Having thus concluded my account of this manner *(manor)*, I cannot omit here remarking that few parishes I have ever met with can shew for so long a series, viz. upw[ds] of five hundred years, such an uninterrupted possession of an estate, which has never been alienated otherwise than as it has passed in marriage or failure of issue male, wherefore it may still be said to continue in the same family." But in rendering this notice to the proprietors of the soil, that learned antiquary might also have adduced, as an equal tribute to local stability, that most of the tenants were of very long standing; and, though some of them have either migrated or died out in the last century, even now there are still on the Doctor's rent-roll the names of Monk, Horton, Gurney, Todd, and Carter, whose progenitors appear as standards on the terriers for 1550 and 1555, recently examined by me at Hartwell: and in another for 1570, William Flameborow occurs, whose line still exists through the variations Pharmborough, Farmborow, and Farmborough.* Hence it is seen that this estate bears holders, whose respective fore-fathers have occupied farms "on his honour's estate" for upwards of three hundred years; and it is certain that a majority of the others are of one hundred years' standing. This, considering the changes of recent times from speculation and high farming, is equally creditable to the lords of the manor and the tenants.

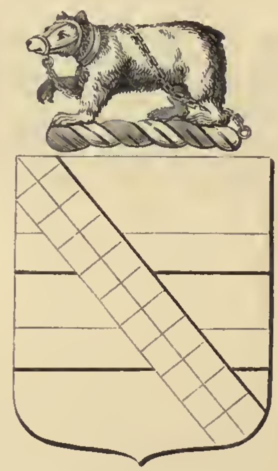
Having thus traced the Lees from their first establishment at Hartwell to the year of Grace 1850, it only remains to notice their heraldic bearings. The acknowledged adherents of Richard the Second, no doubt, wore the cele-

* Could one of this family have been the prototype of Goldsmith's honest farmer, in the immortal "Vicar of Wakefield"? There is inferential testimony to Oliver's having visited these parts; and from a dinner given to him at Bedford, he has perpetuated the epulary powers of the Corporation of that place in his play, "She stoops to Conquer."

brated kneeling white hart as a badge of cognizance, or sign of company, since retainers and followers of every condition bore the order of their leader. But this badge, so annoying on many occasions to Henry the Fourth, was probably never permitted to interfere with the family coats. The shields of the Lees of Adlington and Booths had a bend sable; whilst those of High Legh wore the bend fusilled. The coats of the Lees of whom we have been treating, are thus:—



LEES OF CHESHIRE.



LEES OF HARTWELL.

The old shield was, as usual in earlier times, both simple and significant; but successive intermarriages have introduced various impalements and compound additions. The primitive coat worn by the ancient Cheshire family already mentioned was, *Azure*, two bars *argent*, a bend *sable*, with a Bear statant *sable*; collared and lined *or*, for crest. These arms, slightly differenced, were confirmed and granted to the Hartwell stock in the year 1572, being—Arms. *Azure*, two bars *or*, over all a bend compony *gules* and of the *second*. Crest. Upon a wreath of the colours, on a mount *vert* a Bear statant *sable*, muzzled, collared, and chain reflexed over the back *argent;* the muzzle, in Gwillim's language, binding the beast to good behaviour. Motto. In large letters, VERVM ATQVE DECENS. But in carrying out this grant, the herald seems to have made some omission

in the drawing and blazon of the crest; for the Bear has long been passant over the wreath, without the intervention of a mount *vert*.

The arms and crests now borne by Dr. Lee are seen in Plate II. page 33; and technically may be thus described:—ARMS. Quarterly: first and fourth LEE, viz. *Azure*, two bars *or*, over all a bend chequy *gules* and of the *second;* second and third FIOTT, viz. *Azure*, on a chevron between three lozenges *or* an anchor erect with cable *sable*. CRESTS. First LEE, viz. on a wreath of the colours a Bear passant *sable*, muzzled, collared, and chain reflexed over the back *argent;* second Fiott, viz. on a wreath of the colours a demi-horse *argent*, charged on the shoulder with a fleur-de-lys *sable*. MOTTO. *(Ut supra.)*

There is no local tradition for the introduction of the mouth-fastening, though it may be assumed that there was a reason for it. In a similar case with another Cheshire family, also having a bear for its cognizance, when a stalwart Brereton was guilty of an excess of ardour at a tournament, the king, thinking a mild rebuke was called for, exclaimed—"I shall put a muzzle upon that bear;" and directed it to be notified accordingly by the heralds. It is just possible that the alteration observable in the crest before us, may have resulted from some implied promise of good behaviour on the part of the Lees, to Richard's successors: in the words of King John—

And then their arms, like to a muzzled bear,

were only to be used when the head was released by the proper master.

It should not be overlooked that the Lees of Quarendon, though deriving the name of Lee from the lordship of Lee in the parish of Wibonbury, in the county palatine of Chester, have yawed off from their cousins of Hartwell. The Quarendon branch was brought into Buckinghamshire by Benedict Lee, about the beginning of the reign of Edward the Fourth. That gentleman had issue, by Elizabeth his wife, Richard Lee, who altered the old family arms, and thereby swerved from the main stream. The COAT he assumed was—*Argent*, a fesse between three crescents *sable*. CREST: On a marquess's coronet *or*, a

demi stone-column *argent*, and on its cap a regal crown proper. MOTTO: *Fide et Vigilantia.* The family flourished, and they appear to have been in high favour with Queen Elizabeth (*see page* 62), as well as other sovereigns. In 1674, Sir Henry Edward Lee was created Earl of Lichfield by King Charles the Second, on his marriage with Lady Charlotte Fitzroy, one of the natural daughters of that profligate monarch by the noted Duchess of Cleveland. The ninth son of this newly-made Earl, the Hon. Fitzroy Henry Lee, served in the Royal Navy, and was a very useful though not popular officer: he died a Vice-Admiral in April, 1751.

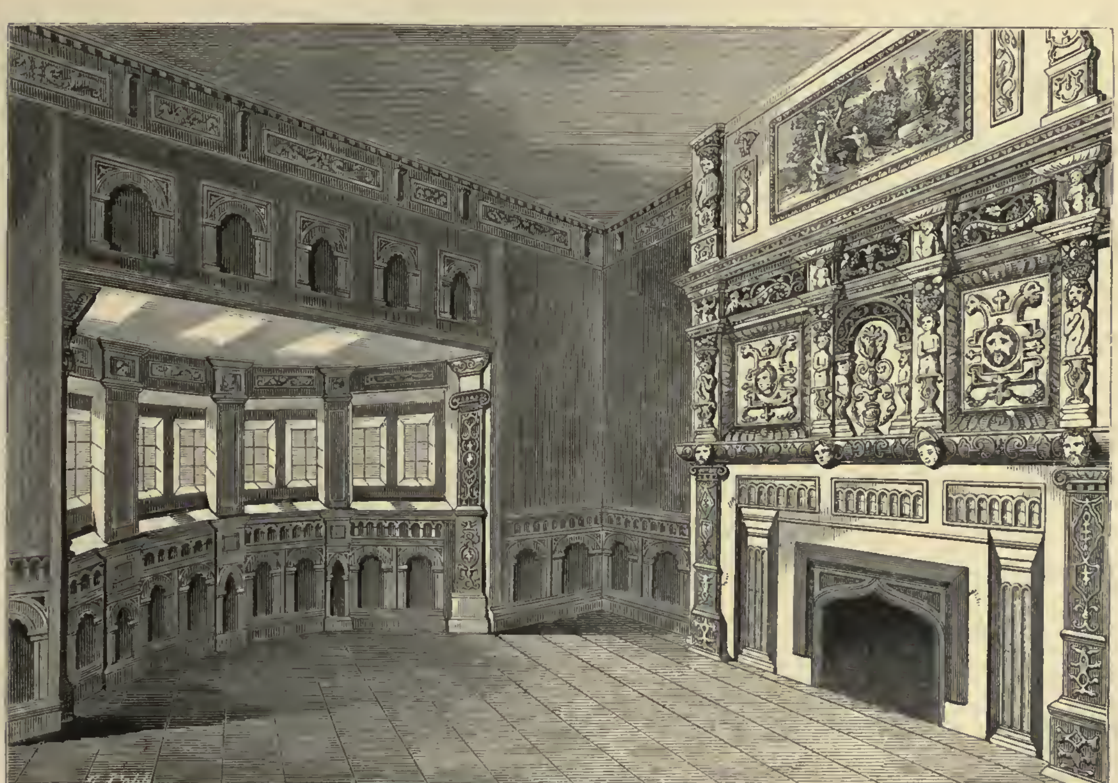
This rapid sketch might possibly have been benefited, as well as enlarged, by consulting the documents of the various Heralds' Visitations which are lodged in the British Museum and the Heralds' College: and, had not that important trust, the Record Commission, been so immaturely strangled, no doubt the several ramifications of the numerous family in hand, had found frequent enrolment among our historical registers. And, indeed, the Lees of Hartwell might be more minutely detailed by a stricter examination of the papers now in the Muniment Room than I have had leisure, or sufficient practice in old writings, to give them. These documents constituted a forbidding *gurgite vasto* when I first inspected them; but they are now being chronologically arranged, under the able inspection of Mr. William Henry Black, of the Rolls' House; and will in future be of comparatively easy access. To assist inquiry, it may be as well to state the principal heads under which the muniments are to be classified, namely,—

I. Charters of feoffment, and deeds of various kinds, from the time of King John (or earlier) to the present time.
II. Royal patents, pardons, and grants, from Henry III. to George III.
III. Fines and inquisitions, from A.D. 1293.
IV. Chirographs of fines, and exemplifications of fines, recoveries, and outlawry, from Henry VII. to George III.
V. Court Rolls of manors, from Edward II. to the present time.
VI. Rentals in rolls and books for Hartwell, Stone, Bishopstone, and Little Hampden, from Edward I. to the present time.
VII. Leases and counterparts, from Elizabeth, or earlier.

VIII. Maps, plans, and surveys or terriers, of estates.
IX. Wills and administrations, from Edward IV. or earlier.
X. Old copies of inquisitions *post mortem*, Henry VIII. and Elizabeth.
XI. Proceedings in law and equity, from Charles II. to the present time.
XII. Assessments on the three Hundreds of Aylesbury.

There are also bundles of letters and papers of miscellaneous kinds; accounts of real and personal estates, of various periods; and several charters without dates, but all prior to the year 1290. This depository is an appropriate and secluded apartment on the first floor, at the north-west angle of the mansion, and apparently in little danger of destruction by fire: the following is a view of

THE MUNIMENT ROOM AT HARTWELL HOUSE.



CHAPTER III.

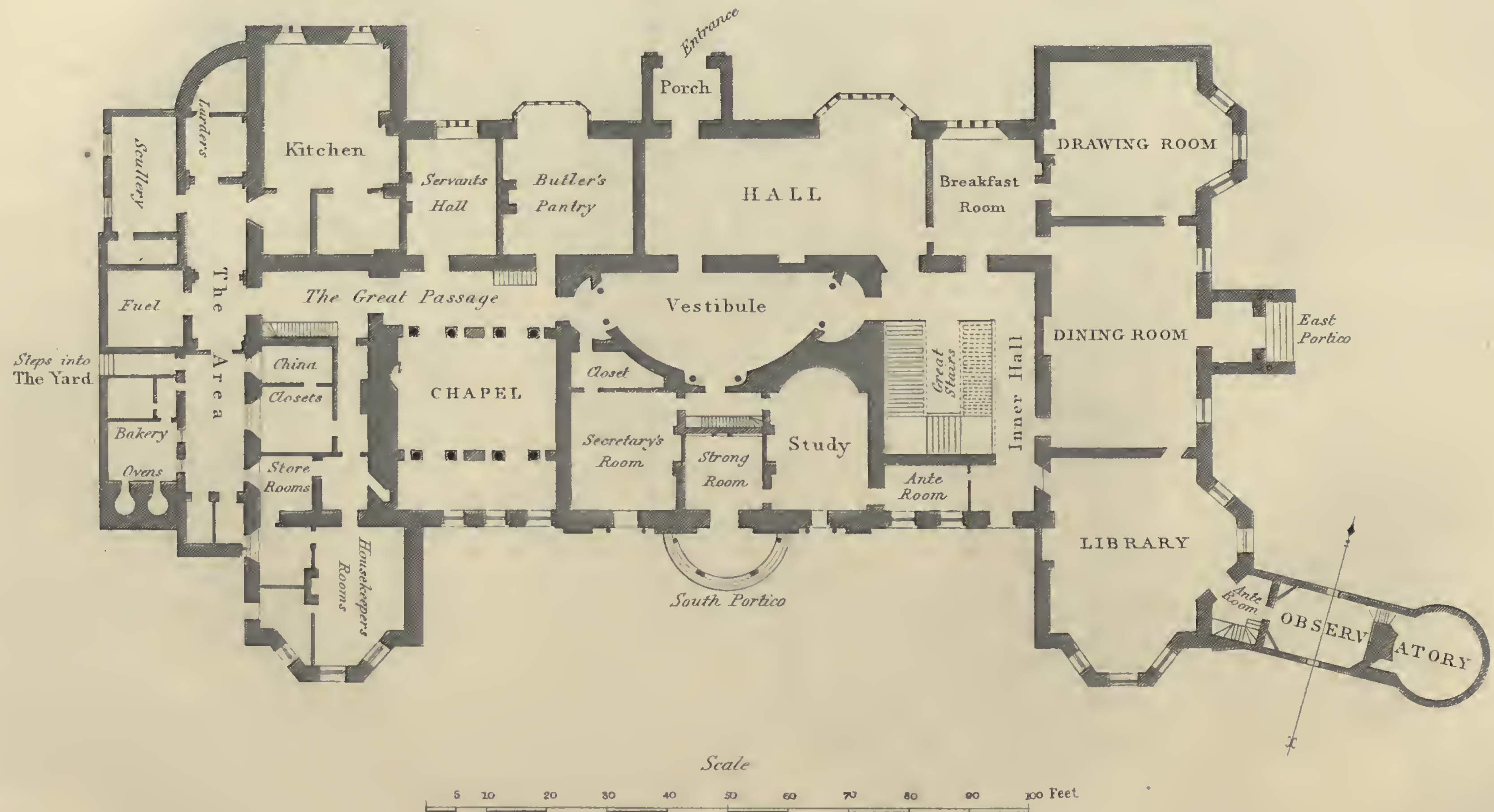
PARTICULARS RESPECTING HARTWELL HOUSE: ITS APARTMENTS, PAINTINGS, LIBRARY, MUSEUM, NUMISMATA, AND EGYPTIAN ANTIQUITIES.

§ 1. THE MANSION.

Hartwell House is, with great propriety of selection and adaptation, erected on a gentle eastern slope from the main road between Aylesbury and Oxford, where it forms the bight or bend whence that part derives its Saxon name,—Bitnam. The park is, therefore, circumscribed on the west by this highway; but its stately trees entirely screen the venerable mansion from the gaze of mere roadsters,—though applicants for admission are never refused.

The building, as already shown, is of considerable age; and, notwithstanding the many alterations and additions it has undergone at various times—for better or for worse—it still retains a large portion of its old structure. It was erected on the site of one much older, by Sir Thomas Lee, who, acquiring the estate *de jure uxoris* in 1570, expended a large sum of money, and evinced much taste in the undertaking. He was, however, fortunate in commencing at a time when Inigo Jones was widely diffusing that domestic architectural judgment, which had made its appearance among us in the days of Henry VIII. and Cardinal Wolsey, who both delighted in rearing palaces; and who, aided by Hans Holbein, opened out the composite of Roman and Gothic styles, which obtained such popularity in England as the *Elizabethan*. And, although the grounds were not "dressed" till after his day, Sir Thomas is considered to have selected

GROUND PLAN OF HARTWELL HOUSE & OBSERVATORY.



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and trimmed the spot for the bowling-green, where it is still known; so that such a space for wholesome exercise was even then a matter of prime consideration. Indeed, a good bowling-green was a constant accompaniment to an old English country seat, until the billiard-room supplanted it: but whether the exchange was a beneficial one admits of a doubt; nor does it appear that there was any reason, save fashion, why the two sports should not co-exist.

The form of the mansion is parallelogrammatic; and it is built of the best stone, timber, and other materials, with hewn work and carpentry of the first order. Its extent, from the eastern porch to the west extreme of the inner offices, is one hundred and ninety feet, with a breadth of one hundred and ten at the two ends; but the actual body of the building is one hundred and sixty feet by seventy *(See Plate VI.)*; and the height, to the parapet on which the "hip-and-valley" roof stands, is forty-five feet. From these figures it will be inferred that Hartwell House is not of a commanding altitude, and it must be admitted that docking the ornamental gables, when Sir William Lee's alterations were made, was hardly admissible: but, approaching by the north, the building derives, from extent of front, a dignity which compensates for the disproportionate lowness of the elevation. The mansion has its four faces placed to the cardinal points of the compass, being directed as exactly as could be expected where no magnetic variation was allowed for in laying out the foundations: the west end of the house is flanked by a semi-circular court-yard, the wall of which bounds the outer offices. There is much variety in these faces; for, while the south and east fronts are light, airy, and recent, the north side presents large windows with appropriate mullions and transoms, and other peculiarities typifying the Elizabethan era; and the western end, with its roughish ashlar work, looks still older. From the dimensions just given, it will be seen that Hartwell House is an extensive one, but not to an enormous degree; whilst, from the convenient disposition of its apartments, it constitutes an excellent dwelling, being a well-designed mean between those vast piles raised for pompous magnificence, and the smaller ones in which convenience is alone considered. In a word, it consults comfort without destroying grandeur, and

thereby avoids the moral of Pope's spiteful invective on the Duke of Chandos :—

> "At Timon's villa let us pass a day,
> Where all cry out, 'What sums are thrown away!'
> So proud, so grand; of that stupendous air,
> Soft and agreeable come never there.
> Greatness, with Timon, dwells in such a draught,
> As brings all Brobdignag before your thought.
> To compass this, his building is a town,
> His pond an ocean, his parterre a down."

This is broad enough, but the poet proceeds to other details with scurrilous personality: yet had he taken salt with Timon!

To conclude the shell of Hartwell House, I may repeat, that the whole edifice is substantially built of white free-stone; and an examination proves that neither expense nor pains have been spared in ensuring durability: it is, indeed, as stout as a fortress, the cellars are like garrison bomb-proofs, and as to the walls, I well remember the difficulty we experienced in cutting through the basement under one of the library windows, in order to make a doorway into the observatory; in doing which we encountered a stout iron bar of connection, which had become so thoroughly case-hardened as to resist our attempts for some time.

§ 2. THE APARTMENTS.

The east and south façades of Hartwell House have each a columned portico; but the usual entrance is by a low porch on the north, which is, as of old, furnished with two sediles, or stout bench fixtures. Having passed this *vestibulum*—so to speak—a fine manorial hall is entered, answering in a modified degree to the inclosed portico, cavædium, or atrium of Roman villas; and from thence, of course, the whole mansion is open and accessible. The older division

of it is laid out in halls and offices on the ground-floor, with the muniment room and a gallery or museum above: the modernized portion contains the general apartments, the library, study, and chapel below *(see Plate VI.)*, with a range of capacious sleeping-rooms over them; and the whole is surmounted with a story of attics, most of which are commodious, without pretensions to architectural elegance. The manner in which the upper rooms were inhabited by the French refugees, companions and suite of Louis XVIII., will be mentioned in the Appendix to this volume.

The great hall, into which the aforesaid northern porch conducts us, is forty-seven feet in length by twenty in breadth, and eighteen in height: the sides of it are adorned with stucco cornices dividing the walls into suitable panels, each surmounted by a bird supporting a festoon of flowers with his beak. On the eastern side is a bust of the celebrated John Hampden on an appropriate bracket; which was placed there by Dr. Lee on the occasion of a monument being erected in Chalfont field to his memory, on the spot where he fell, on the 18th of June, 1843. The ceiling of this hall is elaborately decorated, having in the centre a large and well-executed alto-relievo representing an ox-headed river-deity, reclined as usual on an urn, and holding a rudder: in front of him is a draped female, who—seated amidst architectural remains, with a trumpet by her side—is using a stylus upon her tablet. The whole of this is accurately represented in the head-piece to the quarto edition of Addison's Works (vol. ii. page 1, Edition 1721), drawn by Sir James Thornhill and engraved by George Gucht. It is believed to be an allegorical representation of Genius writing history among the ruins of Italy—"Tauriformis volvitur Aufidus."* An enormous bay-window gives ample light to this excellent specimen of transition architecture, and shews to great advantage the large dimensions of a black marble mantelpiece, about seven feet square, supported

* Being at a cheerful audit-dinner in this hall in 1830, and seated next to an old college chum of the Doctor's, the late Rev. Frederick Pawsey, I asked him whether the river-god over our heads represented Achelous? To this he jocosely replied—"Perhaps so; but he's a calf-headed fellow, at any rate." While laughing at the answer, one of the farmers, Mr. Seaman, said—"No, sir, his horns are too long for that." Something to learn everywhere!

by two figures with human busts, bearded, but ending below as termini. The compartment over it presents, in high relief, an allegorical composition of some pretension to skill in design. A bold commanding figure stands crowned with flowers; he leans on a globe with one arm, and holds a small torch in the other hand. On the table by the side of the globe is a flask covered with twisted straw after the Florentine manner, and a wine-glass; while on one side of the floor lie an Italian mandolin, a flute, a mask, an open book, and a small bas-relievo of two infants dancing; and on the other stand a cock, a dove, and a serpent. Through the columns of this aula, the landscape is marked by two trees, of different species. It is probable that this elaborate piece represents Horace viewing the pleasures of town and country, which he sang so feelingly in his "solibus aptum" taste. Writing to Manutius Plancus (Ode VII. lib. i.), he boasts of his pleasant "domus Albuneæ resonantis," and the Tiburnian groves, giving them the preference to the quiet Lacedæmon and the fertile Larissa:—

> But me, not patient Lacedæmon charms,
> Nor fair Larissa with such transport warms,
> As pure Albunea's far-resounding source,
> And rapid Anio, headlong in its course,
> Or Tibur, fenc'd by groves from solar beams,
> And fruitful orchards bath'd by ductile streams.

In the hall just described there are six oak doors with carved architraves, three of which are for symmetry only: the one on the south-eastern side leads into the breakfast-room, an ante-room formerly appropriated to billiards. It is nearly square, being twenty feet by eighteen; and is lighted by a high mullioned window on the north side, about ten feet wide, and considerately provided with a double casement to ensure comfort in wintery blasts. The walls are decorated with various family-portraits, and some landscapes, ruins, and flower-pieces.

From the breakfast-room, a door near the fire-place leads into the drawing-room, an elegant apartment of twenty-seven feet by thirty (measuring into the bow-window), and eighteen feet high: it is canopied by a richly-moulded ceiling,

representing in bold relief, in the four angles, a lion, a dolphin, an eagle, and a winged dragon. The fire-place is ornamented with a finely-carved high mantel-piece, the centre of which bears—in white marble superposed on yellow—a medallion of a seated hero leaning one hand on his helmet, the other on his sword; he is in gentle communion with a damsel also seated, with one arm resting on a shield bearing Medusa's head. These are apparently intended for Perseus and Andromeda; for, as accessories, the distance on one side represents the rescue from the sea-monster, while Hymen, with his lighted torch, appears on the other. Above the two doors there are classic sopra-porta paintings in chiaro-scuro; and there is another in a similar style above the mantel-piece: the subjects are—a satyr on his knees before a terrified nymph; a centaur galloping off with a reluctant female—perhaps Nessus and Dejanira; and Aurora floating on a cloud, a garland depending from one hand, while the other is raised above her head holding a flower, as if to catch the earliest rays of the rising sun. The hangings and curtains are of light-blue rich damask, with the usual accompaniments of mirrors, marble slabs, and gilt cornices. A large bay to the east, with three high window-frames, not only yields the proper supply of light, but also affords a variety of views, including Aylesbury and its church.

Proceeding through a double door on the south side of the drawing-room, we turn into the spacious dining-room, thirty-eight feet by twenty-five, and continuing of the same height with the hall. These proportions give a pleasing impression; while the richly-wrought ceiling, the numerous paintings, and the properly distributed window-light, render its aspect even noble. The chimney-piece is very large, and of white marble, surmounted with a sea-piece painted by Van Diest, in a marble superstructure, where two small Corinthian columns support a cornice and small pediment, on which recline two little Bacchanalian Putti, one holding a bunch of grapes, the other a cup: on the cornice are the arms of the Lees on a shield, bearing date 1658. The mantel-piece is supported by two smiling female demi-figures, nearly of the natural size, ending as termini from below the busts.

Passing through a door on the south side, also double, from the dining-

room, we enter the spacious library, the dimensions of which are—including two large bays with triplets of windows in them—thirty-six feet long by thirty in breadth, and eighteen in height. The walls are lined with tall book-cases, screened with interwoven gilt brass wire, reaching nearly up to the cornice beneath the ceiling. The two large bay-windows occupy so much space, that there was formerly a continuation of the book-cases across the eastern side, so as to cut off that bay, which was thereby converted into a retired little study: but in fitting-up the house for the residence of the King of France, the central nest of shelves was taken away, and placed behind the communion-table in the chapel, where it still remains. This certainly improved the apartment as a sitting-room; but it impinged greatly on its capacity, and library-like aspect. There was, at one time, some intention of restoring it as of old; but the adjunct of the observatory, and its access through a part of the eastern bay, prevented it. The whole is airy and light; and, as we shall have to return hither presently, it may only be necessary here to add that the fire-place is on the west side, and evinces no little elegance in its construction. The high mantel-piece consists of pure white marble superposed on yellow, and bearing flowers tastefully disposed. In its centre is a large medallion, with a design suited to the application of the room, especially under its late addition: it represents a philosopher, probably Galileo, poring over a problem, while one infant cherub is uncovering a globe, and another is taking the cap off the object-glass of a telescope. Above the cross-piece is a looking-glass subdivided by tracery, surmounted with a large full-length portrait of Lady Elizabeth Lee, painted by Sir Joshua Reynolds.

A concealed side-door near the fire-place leads across the inner hall, which affords other communications with the rooms just described. Keeping on the south side of the house, we pass through a small ante-room into a private but ample study, replete with well-selected books of reference, valuable both for the scholar and the magistrate. On the west side are two doors, the southern of which leads into the strong-room, which, being intended to contain deeds and valuables, is fire-proof; and it has a singularly stout iron recess closed by a

door with easily acting lock and bolts. The other door leads past the foot of a narrow flight of steps belonging to some mezzanini rooms, into the secretary's office, furnished with closets for receiving the accounts of the surrounding estates, admirably arranged by Mr. Blake into half-yearly divisions.

On the right of this office, and stretching from the inner hall beyond the whole length of the great hall *(see Plate VI.)*, is an elegant semi-circular vestibule, as it is called; but being in the very middle of the house, and illuminated only by a large skylight, it answers rather to the *mesaulon* of the Greeks. This centre of the mansion, which rises vertically through the several floors, is well designed and executed. It is decorated with six columns; and in a niche on the north side stands a robed female statue, decked in a tiara, and of a pleasing countenance. Two Roman busts, on the opposite side, harmonise with the general tone.

Continuing through this vestibule, we arrive at the old dismantled chapel, a roomy space where we find the semblance of an altar, but the place has no ornament except its columns. It is now devoted rather to the visible than to the spiritual attributes of the Omnipotent; being used as an accessory to the geological division of the museum above stairs, as well as for the preservation of duplicates in that department as presents to friends. This state of things is not to be ascribed either to the decay of domestic piety, or a failure of the *veteres aviæ;* for it is more than probable that such chapels were mostly used for family worship at times when the parish church was open. This would sometimes inflict a two-fold injury; while the tenantry lost the benefit of the good example of the family's public attendance, the family were deprived of the advantage of hearing the service performed, perhaps, with more propriety and solemnity than at home. The present household of Hartwell attend public worship; but Dr. Lee, persuaded of the duty of private devotion also, regularly reads prayers, and a discourse, to his assembled family, visitors, and domestics, in his drawing-room on Sunday evenings,—an arrangement which assuredly answers every end of assembling together for the recital of religious offices.

The same corridor which the chapel flanks, and which is named the great

passage, leads to the servants' offices on the right hand, and to the housekeeper's department on the left. At the end of it, a stout old staircase ascends to the upper apartments, and is the most immediate way to the Elizabethan muniment-room, to which I have so often referred. During the residence of the Royal Family of France at Hartwell, a time when every part and parcel of the mansion was thickly occupied, this antiquated apartment was the allotted residence of the Count and Countess de Damas, the faithful attendants of the Duke and Duchess d'Angouleme; with whose quarters there was a very easy communication. The closet on the left side of the lobby leading into the muniment-room, was occupied by the Duchess de Serent, the aged mother of the Countesses de Narbonne and de Damas.

The bed-room floor, however, is not usually approached from this side, but rather by the great stair-case, a stately oaken structure, of easy ascent and appropriate breadth. The rails consist of small terminal figures, the upper half of which represent bearded men with their arms folded, as if to sustain the weight superposed by the banister and its semi-battalion of heroes and heroines. That is, twenty-four biblical, heathen, and historical personages, averaging thirty-two inches in height, rather rudely cut in oak, stand on pedestals rising above the hand-rail, placed from five to six feet asunder: without entering into minutiæ, eight armed warriors guard the first flight of steps, mostly with drawn swords and charged shields, the rest wielding rods of office aloft. The fourth figure on the left has a two-headed spread-eagle on his shield; and the opposite corner of the landing-place is filled by a plumed warrior, holding his sword on high, while in a line with him on the right is a bellicose female of the *embonpoint* race. Six steps above her is a marshal, who, like the rest of the heroes, is in armour, with the Roman straps *(loricæ)* pendant from the waist half way to the knees. In the corner of this landing-place is a peaceable damsel, but no beauty: it is probable, however, that the artist could not command elegance. In front of this lady stand the following, which were drawn with no other cause for selection, than merely to give an idea of the whole—

The upper landing-place presents a curious mixture, as, among other figures, we have Samson with a jaw-bone; Hercules in the lion's skin, with his massy club; a gallant crusader; a placid woman; and a fury with distorted features, gnashing her teeth and grasping a snake. It is known that, in consequence of some objection being made to them by the late Queen of France, these statues were removed from the staircase during the royal occupation of the house; and, when replaced, they were probably restored in the present promiscuous manner by accident.

It is evident that some of them are mere allusive and popular emblems; but others must be considered to represent particular persons, and are therefore objects of interest.

§ 3. THE PAINTINGS.

There are few mansions, of the age and extent of Hartwell House, that are not furnished with sufficient productions of elegant genius for the beholders to contemplate with pleasure, instruction, and meditation, as they may severally be inclined: and here are specimens of such variety and in so many different stages of the imitative art, that they are calculated to suit every taste. The paintings are principally distributed in the breakfast-room, the dining-room, the library, the study, and some of the first-floor apartments; and, as I have just hinted, they include products of every branch of artistic skill, whether portraits, groups, landscapes, architectural views, or flowers and still life. Of these a few must be here cited; but I propose to select such only as are remarkable for their excellence, their rarity, or their local interest.

In chronological deference, we might begin with the old picture containing the portraits of Marcus Frienus, Christopherus Laudinus, Angelo Politianus, and Demetrius Græcus: but, as entitled to artistic precedence, the "Old Man's Head," together with its companion, the "Old Woman's Head," both painted by Rembrandt, should, perhaps, first be brought forward. These are two admirable specimens of the powerful command of light, shadow, finish, and colour, possessed by that accomplished artist; and the Old Man's Head exhibits the peculiar handling called "glazing," which he touched so ably without impinging upon spirit. There are also two other heads, so closely in his style as to have been entered in the house catalogue as productions of his pencil; but we can only assign them to some disciple, who was aiming at the remarkable depth of expression of Van Ryn.

In the study is the head of a priest by Vandyck, of almost matchless

colouring, and inimitable truth of expression; being at once easy and natural. In the dining-room is another painting by the same great artist: it is a full-length representation of William Marquess of Newcastle; but the plain dull countenance of that indifferent statesman is far from being relieved by the well-executed and simple disposition of the attire, or the large pointed collar which the pencil has delineated. Of a third production of his pencil I shall speak presently.

In the same room there is a thoughtful Dutch lady dressed in black, said to be the daughter of ...... Coe, a merchant of Holland; it was painted by Van der Helst, and is a fine specimen of the Murillo manner, or perhaps Rembrandt's middle style. And, among other specimens of the Flemish school, the Boors by Ostade; the Collector in his Museum, with "spectacles on 's nose," after Gerard Douw; Isaac blessing Jacob; and Tobit curing his father's blindness, by Sebastian Bourdain, must be studied: and we should also name as worthy of notice the elaborate pictures of Fruit and Flowers, by Witthoos, and by Van der Vaart; Game, by Van de Bilt; Insects and Flowers, by Otho Venius; Landscapes, by Cuyp, Weeninx, the brothers Jacob and Solomon Ruysdael; and the fine marine view before mentioned, by Adrian Van Diest, which has the happy transparent effect of the master, at once harmonizing the shipping, the landscape, and the several groups of figures.

There are several good family portraits by Sir Peter Lely, in which his known talent of giving life to the eye, and an amiable expression to every feature, are happily shewn. Sir Peter was a neighbour of the Hartwell family; having been proprietor of a farm at Prince's Risborough, conveyed to him by Lord Hawley in 1672. He painted the portrait of Vandyck which is in the dining-room; as well as a large family group of children of Thomas Lee, created a Baronet in 1660; a lady, supposed to have been the baronet's wife; Mary Lee, the sister of Sir Thomas; Samuel Lee, his brother; and Sir William Holcroft in armour. Each of these productions is finely finished, of easy attitude, agreeable drapery, and warmth of colour; and the whole bear internal evidence of resemblance to the sitters.

There are also various family heads by Sir Godfrey Kneller, the tone and

expression of which remind one of his famous master, in his best day. Of these, Sir Thomas Lee, the third Baronet, attired in orange-coloured velvet, and Elizabeth Sandys, his wife, in a rich scarlet dress, are of great merit; as is also the portrait of Thomas Sandys, the lady's father, who in a rich *brown* picture, in Sir Godfrey's best manner, is represented in an attitude well suited to the firm expression of his countenance: the costume is Levantine. The maternal uncle of this lady, John Browne, also appears, his good countenance surmounted by a well-curled wig: he was a merchant, and esteemed himself on belonging to the potent city of London,—a city which has become the mainspring and regulator of the commerce of the globe.

Kneller moreover painted the excellent portrait of Alice, daughter of Thomas Hopkins, merchant, wife of the second Sir Thomas Lee; but that of Sarah Sandys, the sister of the above-mentioned Lady Lee, was painted by John Claxton, of Shirley, in Hertfordshire, who became her husband, and who very successfully copied Sir Godfrey's manner. Judith, the amiable wife of Sir George Lee, and her father, Humphrey Morice, a Turkey merchant, an intelligent-looking middle-aged gentleman, are likewise from the easel of Kneller, and indicate strict attention to individuality.

In the study is a portrait of the Right Hon. Humphrey Morice, brother of the wife of Sir George Lee, in an easy reclining attitude, resting from field sports with his dogs and gun, in a fine landscape scene. Near him is a highly-finished painting of Ann, daughter of the third Sir Thomas Lee, in an elegant costume, and in the background is a view of Sudbury, the seat of George Venables Vernon, Esq. afterwards Baron Vernon, to whom she was married. Opposite this is a similarly-painted picture, representing Spencer Schutz, Esq. of Shotover, near Oxford, who married the widow of Colonel John Lee, resting against the stump of a tree with his gun in his hand. From a striking resemblance of style, these were formerly supposed to have been painted by the same artist; but now the lady is considered to have been portrayed by young Francis Mieris, and the gentleman by Arthur Davis. In the same room is a well-painted infant, attired in a splendid satin dress with point-lace ruffles; it is

supposed to be the noted "warming-pan child" of James II. and Mary of Modena. A large family picture is of local interest, as it represents a party composed of Lees, Fiotts, and Arrowsmiths, at a grand hunt at Colworth; and it is curious that it was painted by John Hunt, a knick-knack-aterian of Bedford. There is also an expressive portrait of Lee Antonie, when a boy, fondling a fine large dog, by Daniel Gardner, the friend of Sir Joshua Reynolds; and a small marine painting by Mr. Cowden, Clerk of the Stables to the Queen of England, and presented by him to Sir George Lee.

There are two large paintings in the dining-room, by the intelligent Allan Ramsay, who was a favourite court-painter about a century ago. One of these represents Caroline, consort of George II. with William the young Duke of Cumberland by her side: he is attired in brocade petticoats, with a blue sash over his left shoulder, fastened with a jewel. It is a laboured piece, as the brocade witnesseth; and, from medals and prints of the day, the likeness appears to be truthful. The other picture bears a whole-length of Mrs. Hales, another daughter of Humphrey Morice, taking to the fields in a white satin dress, holding a small bow and arrow, which in her hands seems really *telum imbelle;* a silver crescent on the forehead stamps Diana, the Goddess of Chase and Chastity,—but the *tout ensemble* certainly displays greater merit of execution than of conception. Ramsay also painted the portrait of Colonel John Lee, brother of the Chief Justice, which hangs in the study.

Over one of the doors of the library is a portrait by Hudson, a Dublin artist, of Simon first Earl Harcourt, Viceroy of Ireland, the grandfather of Lady Elizabeth Lee; and over another door is one of Sir George Lee of Doctors' Commons, by the same artist. This last was twice engraved in mezzotinto, and one copperplate served for both occasions. In the first instance, by Faber, Sir George appears in a fashionable velvet coat, with a neckcloth carefully twisted and beaded; but afterwards, though the countenance remained unaltered, an artist named Wills scraped out the modish dress, and replaced it with a full-length regulation lawyer's wig, and robes to match. Impressions of both *tirages* are in Dr. Lee's portfolios.

In the dining-room is Sir William Lee, the brother of Sir George, and Lord Chief Justice of England, in scarlet robes. Near him is his pretty second wife, Margaret Drake, relict of . . . . Melmoth, having features stamped with reflection and talent. This is the Lady whom Sir William married one May morning, as told on page 66 of this volume; and her death and burial are as tersely commemorated in a receipt from one Samuel Hughes:—"Received, June 10th, 1752, of the Rt. Hon. Lord Chief Justice Lee, the sum of one hundred and two pounds ten shillings, being the full payment for the funeral of Dame Margaret Lee, and in full of all demands."

Sir Joshua Reynolds exerted his skill in perpetuating the Lees of his day, and has consequently left some excellent specimens of his powers at Hartwell, where he was a welcome visitor: but the sad vice of deteriorating oils, with which he was infatuated, is strongly displayed both in faded tints and in cracks. Over the mantelpiece of the library is the before-mentioned portrait of Lady Elizabeth Lee, which has been twice engraved; the first plate was executed under the burin of Fisher, and the second by J. Watson; the impressions of both were sold at 7*s.* 6*d.* each. This picture, though unexceptionably placed, has suffered greatly from the cause just stated: she is seated under a tree, in a pensive attitude, and the elevated expression of her features forcibly recalls the late Mrs. Siddons to my mind. The same impression does not hold when viewing another beautiful portrait of Lady Elizabeth employed in fancywork, drawn in crayons by Miss Read.* Sir Joshua also painted Sir William Lee, her Ladyship's husband; and Ann, daughter of Sir Thomas Lee, married to G. V. Vernon of Sudbury, afterwards Lord Vernon. The last is in an elegant *chapeau de paille* manner; but the finest of Sir Joshua's productions here—in my estimation, at least—is the beautiful head of Philadelphia, daughter of Sir John Dyke, Bart., who married William Lee, son of the Lord Chief Justice.

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* The Crayonists were boldly emulous; for the portrait which Sir Joshua made of Sir William Lee very soon had a parallel in a crayon-drawing by Hoare. This was a style of art in which Lady Elizabeth herself was a proficient: and there are several fine specimens by various artists, in the Hartwell Collection.

He also painted the portrait of Frederic Prince of Wales for Sir George Lee, who sent it to Hartwell; besides which another likeness of his Royal Highness, by Ramsay, was presented by the good Prince himself.

The easternmost bed-chamber of the first-floor on the south façade, was occupied by Sir George Lee: in it are seven pictures with black frames, shewing the ornamental grounds of Hartwell as they existed a century ago. The execution is very laboured, and probably very faithful; and they are therefore of considerable local value, though not at all artistic. They appear to have been painted before that shewn on Plate III.; but they exhibit the same formal piece of water, angular walks, and lofty wall of yew, with the row of high arches cut therein. A few other particulars may be reaped, on closely inspecting these memorials.

Without going into an enumeration of all the paintings, mention should be made of two good landscapes by Bolognese, architectural scenes by Paolo Panini, ruins by Roland Savory, a head of Charles the First by Old Stone, animals by Burton, and the portrait of Louis XVIIIth of France, painted by Robert Le Fevre in 1817, and presented by that King to the late Sir George Lee. The features in the last painting bear stronger evidence of truth than of sublimity of mind, yet there is a tone of expression which evinces goodness of heart.

We may now dwell upon a picture which, from many recollections, must be esteemed one of the most interesting in the collection. This is a capital whole-length portrait of the celebrated Sir John Suckling, whose connexion with the Lee family is shewn at page 63: it is seven feet high by rather more than four broad, and was actually painted by Vandyck, although Sir Joshua Reynolds, when at Hartwell, pronounced it to be the work of Cornelius Jansen.* Sir John is seen standing, and leaning his left arm in a contemplative mood on a rock inscribed *Ne te quæ sciveris extra*, with a folio book thereon, on a paper between

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* In a letter cited by Suckling's biographer, the knight thus speaks of the artist:—"And for Mistress Delanae's we do not despaire but Vandyck may be able to copy it; three score pounds wee have offered, and I think four score will tempt him." Considering the value of money in those days, this extract shews the high estimation in which Vandyck was held by his contemporaries.

the leaves of which appears the title SHAKESPEARE *(sic)* ; he has light auburn hair, and wears it in the flowing style so offensive to the Round-heads of his day; he is dressed in close vestments with a blue surtout over them, upon which a scarlet mantle is fastened on the right shoulder by a gold button; and he wears half-boots of untanned, or yellowish-brown leather in the buskin fashion. The whole is richly coloured, and not over-poweringly dark, as was so common with the leaders of art in that day. This portrait may possibly be the one mentioned by Aubrey, in his Lives of Eminent Men, as being in the house of Lady Southcote, a sister of Suckling; but the local belief is, that it was brought to Hartwell on the marriage of Ann Davies, his sister's daughter, with Sir Thomas Lee.

Sir John was a man of prepossessing address, and great general talent; but he rather merited being classed with a Buckingham, a Wharton, or a Rochester, than with Julius Cæsar, whose intellectual acquirements were better ballasted, for the inimitable Roman was a man equally qualified for fun or mischief—legislation or law-breaking—squabbles or conquest. Sir John was earnest in some of his principles; but his brief life affords an instance of its being easier to give instruction, than to set example, since he has only left sufficient character to stamp him as a gallant admirer of the fair sex, a gay courtier, a reckless gambler, a holiday soldier, and a sparkling poet. Still he was a remarkable young man, and it is not easy to pronounce how he would have stood, had he been destined to a longer life. His poems, though too prurient for the present age, have an elegance which entitles them to admiration; and in his description of feminine grace he is peculiarly happy. Even when rioting in witty levity, he is rarely coarse; and his well-known "Ballad upon a Wedding" has long been admired for graphic description and beauty of expression. This lively effusion was occasioned by the marriage of Lord Broghill with Lady Margaret Howard, daughter of the Earl of Suffolk; and, in perhaps its finest verse, a felicitous allusion is made to that charming old superstition of the English peasantry, namely, that on Easter morning the sun always dances :—

Her feet beneath her petticoat,
Like little mice, stole in and out,
  As if they fear'd the light:
But, oh! she dances such a way!
No sun upon an Easter-day
  Is half so fine a sight.

The book in the picture before us, being thus selected, affords a good indication of sound judgment, and illustrates a literary anecdote recorded by Rowe and others. In a discussion respecting the intellectual endowments of the immortal Bard of Avon, between Sir John Suckling, Endymion Porter, Sir William Davenant, Mr. Hales of Eton, and Ben Jonson, Suckling, who was a professed admirer of Shakspeare, had undertaken his defence against Ben with some warmth; Mr. Hales, who had sat silent for some time, broke out, saying, "That, if Mr. Shakspeare had not read the Ancients, he had likewise not stolen anything from them: and that, if Ben would produce any topic finely treated by any one of them, he would undertake to show something upon the same subject at least as well written by Shakspeare."

But a point of some interest in "folk-lore" must not be overlooked, since accuracy is the soul of record. Every one remembers how inveterately the fine old Latin adage—"Incidis in Scyllam, cupiens vitare Charybdim"—of Philip Gaultier, has been cited as a line of Virgil's. In like manner, the following passage has been almost universally ascribed to Butler:—

For he that fights and runs away
May live to fight another day.

But it is nowhere to be found in that poet's works: a parallel appears, however, in Hudibras *(l. iii. canto iii. v.* 243*)*, where the right-trusty Squire Ralpho defends his stratagem:—

To make an honourable retreat,
And waive a total sure defeat:
For those that fly may fight again,
Which he can never do that's slain.

At page 63 of this work, I alluded to Sir John's having been sorely taunted by the wits and witlings of the time; and the Puritans even belaboured his memory after his untimely death with bitter acrimony. Now it is said that the contested lines above quoted were vented by the Comptroller of the Navy, Sir John Mennis, *circ.* 1641, and afterwards printed, in a volume intituled *Musarum Deliciæ,* published by him and Dr. Smith in 1656. But neither there, nor in the equally often quoted *Wits' Recreations,* printed by Blundell in 1640, nor in the *Censura Literaria,* have I been able to meet with the verse. A ballad attributed to Mennis appears in many works of the period, and has also found admission, dirty as it is, into Bishop Percy's Collection: it displays more spite than poetry, commencing—

Sir John he got him an ambling nag,
To Scotland for to ride-a,
With a hundred horse more, all his own he swore,
To guard him on every side-a.

No errant knight ever went to fight
With halfe so gay a bravado,
Had you seen but his look, you'ld have sworn on a book
Hee'd have conquer'd a whole Armado.

The ladies ran all to the windowes to see
So gallant and warlike a sight-a,
And as he passed by, they began to cry,
Sir John, why will you go fight-a?

But he, like a cruel knight, spurr'd on,
His heart did not relent-a,
For, till he came there, he shewed no fear,
Till then why should he repent-a? &c. &c.

Another sharp lampoon, in a similar metre, and apparently from the same pen, thus flings at the cavalier:—

I that did lend, and yearly spend,
Thousands out of my purse-a:
And gave the King, O wondrous thing,
At once a hundred horse-a.

And he wished to make out that this dashing body, as with Pecksniff's steed in our times, was "all action and no go."

From the Life of Suckling, published by the Rev. Alfred Suckling in 1836, it is clear that the knight was grossly misrepresented. He wrote from the Trent side, whither he had led his company of splendid horsemen, that the war was in the state of that portion of the twenty-four hours which we can neither call night nor day. He believed the political question to be, rather, king or no king, than bishop or no bishop. The cavalry was commanded by Lord Holland, "fitter for a show than for a field," who ordered the retreat of Dunse without striking a blow. Mennis's ballad owed its popularity to Suckling's being obnoxious to the Parliamentarians; for it is certain he was in such general high repute, that he continued to enjoy the King's favour, and remained with the army till the negociation with the Scotch was effected. Yet the scurrilous ballad is thus closed:—

And now there is peace, he 's return'd to increase
His money, which lately he spent-a,
But his lost honour must still lie in the dust,
At Barwick away it went-a.

But the disputed verse! After I had in vain searched for it in the British Museum, and elsewhere, the subject was brought forward by some of Mr. Thoms's correspondents, in the periodical named "Notes and Queries." It was suggested that the navy surveyor might have borrowed the hint—for its being his was not questioned—from a work called "Apophthegmes, &c. gathered and compiled in Latine by the right famous Clerke, Maister Erasmus, of Roteradame. And now translated into Englyshe by Nicolas Udall, 1542:" in which the couplet is thus expressed:—

That same man, that renneth awaie,
Maie again fight, an other daie.

This work and its translation were published early enough for both Mennis and Butler to have seen, had it been necessary to borrow an image which must have been common for ages. Where Erasmus first picked up his story it matters not, for the passage is cited as a well-known proverb in the *Noctes Atticæ* of Aulus Gellius. But *nil sub sole novum.* In the "Apophth. liber iv. Demosthenes Orator," Erasmus shews that, in his judgment, it was a common saying many ages ago: "Demosthenes clypeo suo literis aureis inscripserat ἀγαθῇ τύχῃ, id est, *Bona Fortuna.* Attamen cuum ad pugnam ventum esset, illico projecto clypeo aufugit. Id quum illi probro daretur, quod ῥίψ ασῶις esset, elusit vulgato versiculo:—

Ἀνὴρ δὲ φεύγων καὶ πάλιν μαχήσεται,

id est,

Vir qui fugit, rursum integrabit prælium—

judicans utilius esse patriæ fugere, quam in prælio mori. Mortuus enim non pugnat, at qui fuga quæsivit salutem, potest in multis præliis patriæ usui fuisse." This will answer for an age of one thousand two hundred years. Need we penetrate further into Ogygian mist for authority?

§ 4. THE LIBRARY.

Having, in our tour of the rooms, merely passed through the library, we will now return for a more deliberate view, as its contents are of considerable importance to the adjoining observatory; of which a separate description must be given. In doing this, the reader shall not be detained with the paintings of old astronomers, the various busts, nor the portraits of Dr. Lee's learned friends; but an exception may possibly be made in favour of the fine marble

bust of the immortal Newton, sculptured for the Doctor from the well-known one by Roubilliac in Trinity College, Cambridge. The large bust of Laplace, which was kindly forwarded by Madame Laplace with another copy for the Bedford Observatory, also merits mention; and, though the names of other gentlemen be omitted as lesser lights, the busts of Mrs. Somerville and Mrs. Smyth, with the portrait of Miss Herschel, should be noticed in deference to the fair sex. These, however, as above said, shall not retard our progress; the return to this spacious room being to catch a glance at its more scientific furniture.

Perhaps the magnificent terrestrial globe, five feet in diameter, with a polar-axis mounting, which graces the south bay-window, as well as the celestial globes near it, might merit a particular record, were it not that every suitable visiter is tolerably well acquainted with their uses. There is also a very elegant and efficient instrument called a Jupiter's Satellitian, invented by the late Dr. Pearson, and made for him by Fayrer; as well as an excellent Tellurian and Lunarian, by the same persevering astronomer, in which the motions given to the Earth and Moon, as well as those of the inferior planets, Venus and Mercury, are, with extremely well-arranged wheel-work, driven by a watch movement. These instruments have been so fully described by Nicholson, Brewster, and Dr. Pearson himself—by the latter in Rees's Cyclopædia, as to require no further mention. Proceed we therefore to the books.

It should be remarked, that, from the union of the Hartwell, Colworth, and Totteridge libraries, together with the constant additions which have been made by Dr. Lee, the collection is very extensive and valuable. It comprises, in a word, all the best works in the ancient and modern languages in every department of intellectual culture; as well in divinity, history, and law, as in poetry, belles lettres, fine arts, antiquities, natural history, and voyages and travels. Hence the accumulation has been so great, that Dr. Lee has been driven to distribute his books in classes among the various apartments of the house; and, besides those in the principal bedrooms, there is a suite of six airy attics devoted to that object. But our present attention must be directed only to the graver order of books before us; for, since the observatory has been attached,

this room has become the principal depositary of ready reference and mental aid for that establishment.

The portion of the library now treated of, consists therefore of mathematical and philosophical works in their various forms and applications, both English and Foreign, from the earliest period to the present time; among which are many of rare occurrence. The astronomical branch—with its dependent mathematics, optics, and mechanics—is especially rich, both in standard publications and periodicals: there are moreover copies of the best sidereal atlases; astronomical observations and catalogues of the Observatories of Greenwich, Cambridge, Oxford, Edinburgh, Göttingen, Dorpat, Madras, Cadiz, and the Cape of Good Hope; and the transactions of Academical Societies in London, Paris, Berlin, St. Petersburg, Turin, Leipsig, Philadelphia, and other places. It may therefore aid consultation to give an alphabetical roll of the host of authors in this scientific treasury:—

Adams, George
Airy, George Biddell
Apollonius *Pergæus*
Arago, F. I. D.
Aratus *Solensis*
Archimedes *Syracusanus*
Argelander, F. G. A.
Argoli, Andreas
Aristarchus *Samius*
Assemanni, Simon
Atwood, George

Babbage, Charles
Bacon, Francis
Bagay, V.
Bagwell, William
Baily, Francis
Bailly, John Sylvanus
Baker, Henry
Bamfield, Samuel
Barlow, Peter
Barret, John
Barriffe, William
Barrow, Isaac
Bartholini, Erasmus
Baselli, C. G. A
Baxter, Andrew
Beaufoy, Mark
Beccaria, Giambatista
Beer, William
Belidor, Bernard
Benese, Syr Rycharde
Berkeley, George
Bernouilli, Daniel
Bernouilli, John
Berthoud, Ferdinand
Bessel, F. W.
Bion, Nicolas
Biot, Jean Baptiste
Bisset, Charles
Blagrave, John
Blanchino, Francisco
Bland, Miles
Bode, John Elert
Bonnycastle, John
Borelli, Pietro
Boscovich, R. J.
Bossut, Charles
Boyle, Robert
Bradley, James
Brahe, Tycho
Brent, Charles
Brewster, David
Bridge, Benj.
Briggs, Henry
Brisbane, Thomas MacDongal
Brinkley, John
Bryan, Margaret
Burckhardt, J. C.
Burg, M. de
Burnet, T.

Cacciatore, Nicolò
Cagnoli, Antonio
Calandrelli, Giuseppe
Calemand, M. N.
Callet, François
Carnot, L. M. N.
Carr, Rev. John

Cassani, P. Joseph
Cassini, James
Cassini, M. le Comte de
Cavalieri, Bonaventura
Cerquero, José Sanchez
Chagim, Elias
Chapman, Frederic
Churchman, John
Clairaut, Alexis
Claridge, John
Clarke, John
Clavius, Christopher
Coddington, Henry
Colson, Nathaniel
Condorcet, M. I. A. N. C.
Copernicus, Nicholas
Costard, George
Cotes, Roger
Cowper, Spencer
Creswell, Daniel

D'Alembert, Jean Leroud
Dalley, Isaac
Damoiseau, M. C. T.
De Chales, C. F. M.
Delambre, J. B. I.
Dell, John
De Morgan, Augustus
Derham, W.
Desagulieres, J. T.
Desargues, M.
Descartes, Renatus
Digges, Thomas
Dionysius *Periegetes*
Ditton, Humphrey
Dobrzensky, Jacobo
Dollond, John
Domckius, G. P.
Doppel, Maier
Dunn, Samuel
Dunthorne, Richard
Duræus, Samuel
Dutens, M. L.

Earnshaw, Thomas
Eichstadius, Laurentius
Emerson, William
Encke, J. F.
Englefield, Henry C.
Epps, James
Everard, Thomas
Euclid *Alexandrinus*
Euler, Leonard

Fagard, M.
Ferguson, James
Férussac, Andr.
Firmici, Julius
Flamsteed, John
Focard, Jacques
Foliani, Ludovico
Fontenelle, B. de
Forster, William
Foster, Samuel
Frampton, John
Francœur, L. B.
Franklin, Benjamin
Frend, William
Frisius, Gemma R.
Frontinus, Sextus Julius
Fuentes, Alonzo de

Gadbury, John
Galileo, Galilei
Gans, David
Gassendi, Peter
Gauss, Charles Frederic
Gilbertus, Guillelmus
Gérard, Albert
Goad, J.
Goldingham, John
Gompertz, Benjamin
Good, J.
Goudin, M. B.
Granville, A. B.
Graves, J.
Gravesande, W. J. le s'
Gregory, David
Gregory, Olinthus
Groombridge, Stephen
Gunter, Edmund

Halley, Edmund
Halma, N. B.
Hamilton, Hugh
Hansen, C. A.
Hansen, P A. von
Harding, C. L.
Harris, John
Harris, James
Harrison, John
Hartzill, M.
Harvey, Richard
Hassler, F. R.
Hawksbee, Francis
Heath, Robert
Hell, Maximilian
Helsham, Richard
Henderson, Thomas
Herschel, Caroline
Herschel, William
Herschel, John F. W.
Hermann, Jacobus de Regiomonte
Hevelius, John
Higgins, Bryan
Hill, John
Hind, J. R.
Hirsch, Meyer
Hobbs, Thomas
Hodgson, James
Horsley, Samuel
Hook, Robert
Huff, Philo
Humboldt, Alexander von
Hutton, Charles

Sabine, Edward
Sacrobosco, Johannes de
Sapidus, J.
Savilius, Hen.
Scheubelius, Jo.
Schotti, Gaspar
Schöner, Johannes
Schulten, N. G.
Schumacher, H. C.
Sédillot, J. J.
Shepherd, Professor
Sherwin, Henry
Shuckburgh, George
Simms, Fred. W.
Simson, R.
Simpson, T.
Smith, Robert
Smith, James
Smyth, William Henry
Snellius, Willebordus
Solinus, C. Julius
Somerville, Mary
South, James
Sprat, Thomas
Squire, Jane
Squire, Thomas
Stellati, M. Pal.
Stone, Edmund
Stoeffler, M.
Streete, Thomas
Struve, F. G. W.
Sturmy, Samuel
Sturmius, J. C.
Svanberg, Jöns
Switzer, Stephen
Sykes, Dr.

Tacquet, Andreas
Taylor, Brook
Taylor, Joseph
Taylor, Michael
Theodorus *Gaza*
Theon *Smyrnæus*
Thomson, David
Tilloch, Alexander
Toaldi, Giuseppe

Ulloa, Antonio de
Ulugh Beigh

Velschius, M.
Vieta, Francis
Villemer, Pierre
Vince, Samuel
Vlacq, Adrian
Voltaire, F. Arouet de
Vossius, Gerard John
Vossius, Isaac
Vulliamy, B. L.

Wales, William
Walker, John
Walker, Ralph
Wallis, John
Ward, John
Ward, Seth
Waring, Edward
Watts, J.
Weidler, J. F.
Wells, John
Wharton, George
Whewell, William
Whiston, William
Whitehurst, John
Wilkins, John
Wilson, B.
Wilkström, Anders
Wing, Vincent
Wingate, Edmund
Wollaston, Francis
Wood, James
Woodhouse, Robert
Woodward, John
Worthington, William
Wotton, William
Wright, J. F. M.

Ximenes, Leonardo

Young, Thomas

Zach, Fran. Xav. von
Zanotti, Eustace

These are the authors of the greater portion of the printed books; but there are also some valuable manuscripts on mathematical and scientific subjects. Of these it may only be necessary to place before the reader a few of the Arabic, Persian, and Turkish works which Dr. Lee purchased in the Levant; in obtaining many of which he had the assistance of the estimable and regretted Burckhardt. In this selection the task has been easy enough, the titles having been accurately translated, with lucid comments, by that learned

Orientalist and critical Classic scholar, the Reverend George Cecil Renouard, the highly-prized and long-tried friend of both Dr. Lee and myself:—

Rakáyiku-l hakáyik fí hisábi-d-direj wa-l dakáyik.—A Treatise on the Calculation of Degrees and Minutes, by Mohammed Sabt-al-Márdíní. Transcribed A.H. 944 = A.D. 1538. 8vo. Abú 'Abdu-llah Shamsu-d-dín Mohammed, surnamed Sabtu-l Márdíní, was a great lawyer, as well as an astronomer. He died A.H. 788 = A.D. 1386.

Sherhi-t-tedhkireh.—A Commentary on the Astronomical Memorabilia of Nasíru-d-dín et Túsí, by Al Jorjání. Finished A.H. 811 = A.D. 1408. 8vo. This copy has been carefully corrected. According to D'Herbelot, Al Jorjání died in A.H. 810 = A.D. 1407; (Tadhkerat al Nassiriat, III. 378.) He is called Al Seyyid, al Sheríf, 'Alí ibn Mohammed (Tagrid al Kelam, III. 385), Abú Hasan, or Hosaïn, born A.H. 740 = A.D. 1340; died at Shíráz, A.H. 816 = A.D. 1413.

Al Wasílah beïni-l-talabah.—A Treatise on Arithmetic and Algebra, abridged by Ibnu-l Khátim, from the Ma'eínah of Mansúr el Hataf el Túsí, with an Italian version.

The Arabic text was copied from a MS. (No. 327 in Assemanni's Catalogue of the Laurentian Library at Florence), written by Ibnu-l Khátim A.H. 762 = A.D. 1360, at Jerusalem.

Zíju-l Mukhtár.

Az-zíju-l mukhtár mina-l azyáji-l mufdí bí-l 'ámili bedí' ila audahi taríkatin, wa minhájun 'ala-t-tamámi wa-l kemáli; wa-l hamdu li-lláhi 'ala kulli hálin. Tumma, i. e. A Table selected from Tables which open the path to the beginner in his search for the clearest way and the high road to completeness and perfection (in Astronomy). Praise be to God in every state! Finis. The book is divided into two sections; the first having 45; the second, a great number of Tables of the Planets, from Ibn Yúnis.

The work is dated, in the colophon, Saturday, 13th Shawwál, 1007 = A.D. May 1599.

This copy appears to have belonged to the Library of Ahmed al Damanhúrí, superior of the Fakírs in the Mosque El Azhar, at Caïro; and title-page, and fol. 192.

Kitábi-l lam'ah fí halli-l kawákibi-s-sel 'ah.

"The Book of Flashing, for the Solution [of Problems] respecting the Seven Stars," by Ahmed ibn Gholámi-llah, ibn Ahmed, surnamed El Kúmu-l-reïshí, Time-keeper in the Cathedral of Muayyad [at Káhirah.]

Ahmed ibn Gholám says, that having written a work entitled *Noz-hatu-l-khátir fí talkhísi zíji ibni-sh-Shátir,* i.e. "The delight of the heart in the Explanation of the Tables of Ibnu-sh-Shátir," he abridged it in this work.

No date; but of considerable antiquity: chiefly astronomical tables.

Tractatus Astronomici, Arabicè.

i. *An Introduction to the Knowledge and Use of the Astrolabe*, by 'Azzu-d-dín Yúsuf, el Zinjáfí. Finished A.H. 790=A.D. 1387.

ii. *On the Art of finding the Zenith in every Altitude, &c.; the Declination of Places from each other, &c.* Extracted from some Treatises on the Astrolabe.

iii *A Table for finding the Place of the Sun and Moon in any of the Signs of the Zodiac.*

iv. *A Table of the Longitude and Latitude of various Places:* (the Longitude reckoned from the Fortunate Islands), viz. Mekkah, Baghdád, Baṣrah, El Mauṣil, Istánbúl, Arz-Rúm (sic), Miṣr (*i. e.* Al-ḳáhirah), Beïtu-l Maḳdes (Jerusalem), El Ḥasá (Laḥsá, or El Aḥsá), El Ḳaṭíf, Tebríz, Dimeshḳ, Ṣaïdá, Ganjah, Tiflis, Shamákhí, Iṣfahán, Ḥaleb (Aleppo), Niṣíbín, Sinjár, Rás'Aïn (sic), Márdín, 'A'nah, El Raḥabeh, Tekrít, Erbil (Arbela).

v. *Al Ṣafíḥatu li emkáni resemihá'alạ Ṣafíḥatin min safáyiḥi-l Asterláb.*

A Tablet for the places drawn on one of the sides of the Astrolabe.

"A wonderful Treatise on the Astrolabe, as it is noted in the margin of the first page."

vi. *A Treatise on the Sphere, and the use of it.* Docketed in the same Ta'líḳ hand as above, "This is an approved Treatise on the Sphere, from the words of Ḥabash, the Calculator. It is an explanation of the Heaven and Earth; an explanation of the North and South."

vii. *Risáletu-l fat-híyetu fí-l á 'máli-l jeïbíyeti; i. e.* a Treatise explaining the use of Sines, by the Sheïkh Bedru-d-dín Moḥammed Sabṭ el Márdíní.

viii. A Treatise on the *Use of the Quadrants* marked with (al Moḳanṭerát) Circles parallel with the Horizon. By Abú-l 'Abbás Aḥmed el Majdí.

ix. *A Metrical Catalogue of the Stars;* in Arabic. By Abú 'Alí, son (najl) of Abú-l Ḥoseïn el Ṣúfí, dedicated to Abú-l Ma'álí Fekhru-d-dín Sháhinsháh.

The Metre is — — ⏑ — | ⏑ — ⏑ — | — — ⏑ Mustaf'ilun (twice) Maf'úlun.
⏑ — ⏑ — | ⏑ ⏑ ⏑ — |
| — ⏑ ⏑ — |

Abú 'Alí, author of this work, refers to a larger work on the same subject, by his father, Abú-l Ḥoseïn el Ṣúfí, who was probably the celebrated Astronomer Abdu-r-raḥmán ibn 'Omar ibn Sehel Abú-l Ḥuseïn, el Ṣúfí, who died A.H. 376=A.D. 986. (Abú-'l Faraj Hist. Dynast. I. 214, II. 325.) He was patronized by 'Aẓẓudu-d-daúlah, Sulṭán of the Arabian 'Iráḳ. Fakhru-d-dín, here named, therefore, may have been his brother, Fakru-d-daúlah, who reigned over the Persian 'Iráḳ from A.H. 373 to A.H. 387=A.D. 983—997.

On the blank leaf at the end there is a charm; with directions, in Turkish, how to use it in order to procure a pleasant dream.

These tracts are all neatly written in the Niskhí hand, by the same transcriber, and are probably not a century old.

Taḳwímu-l Maḳdesí.

Kitábu Taḳwími'alạ-l ḳaúli ḳawáníni-l kullíyeti wa-l aḥkámi-l mufaṣṣalaṭi fí hádhihi-s-sanaṭi-sh-shemsíyeṭi.—A Book of the Calendar according to the general Rules and the Determinations for this Solar Year.

An Almanack for the Solar Year, beginning on the 21st of Dhí-l ḳa'dah, A.H. 1082=20th of March 1672.

At the end is written, *in the hand* of the possessor:—"Calculated by the poorest of the servants of his Exalted Lord, 'Abdu-llah ibn Aḥmed, el Maḳdesí, el Ḥanbalí. May God pardon him, his parents, his ancestors, and whomsoever shall look into it!"

The impression of a seal below shews that the calculator mentioned above was possessor of the book. It is El Faḳír 'Abdu-llah ibn Aḥmed, el Maḳdesí (the Dervísh 'Abdu-llah, son of Aḥmed, of Jerusalem.)

Kitábu-l jefru-l jámi' wa-misbáḥu-n-núri-l-lámi'.—On Divination, by El-Bisṯámí. Transcribed A.H. 1102=A.D. 1691. 8vo. See D'Herbelot (Bastham), I. 377; (Thalahah), III. 476. Kemálu-d-dín, Abú Sálim, ibn Tálihah, al Bisṯámí, is the author's name, according to D'Herbelot.

Al Arba'íniyyah wa-l Ḥisáb.

i. *Sherḥi-l nukáaṯi-l ḍurúriyyeṯ wa'l arba 'íniyyeṯ li Borhánu-d-dín Ḥojjeṯu-l islám.*—A Commentary on the Arba'íniyyah, or Forty Questions, of Borhánu-h-dín Ḥojjeṯu-l-islám. The last pages are wanting, the thirty-seventh being the last question treated of. Ill written in Niskhí characters; the points being often omitted.

ii. A Treatise on Arithmetic, divided into a Moḳaddemah (Introduction) and two Sciences (Fenneïn). The second chapter contains the Arithmetic of Fractions. The Second Part, Fenn, or the Branches of Arithmetic, comprehending Mensuration of Bodies, with four Moḳaddemahs or Appendices. Transcribed by its possessor, Jemál ibn Niẕámu-d-dín, in the middle of Jumádhi-l A'kher, A.H. 803=A.D. 1401, in the Medreseh (College) of . . . . in the city of Sulṭániyyeh. A small part of the beginning is wanting. In the Ta'líḳ hand; ill written, and the points generally omitted: the latter part is dreadfully worm-eaten.

The Moḳaddemah contains two Sections: 1. On Arithmetic, its data; Numbers, and their divisions. "Arithmetic," it says, "is the science which teaches methods of bringing out unknown from given known quantities." The 2d Section treats of the forms of numbers, and their ranks, as determined by the Indian sages. The nine digits are there given.

Risáleh Fí 'Ilmi-l Jefr:

Risáleh fí 'ilmi-l jefr.—A Cabalistical and Astrological Treatise; "the conception of which began in the first hour of the second day of the third decade of the fourth month of the fifth period of the First Age, and of the second decade of the Flight (Hijrah) of the Lord of Created Beings," &c.; and its transcription was finished on the 29th of Ramaẓán, A.H. 1083=A.D. 1673, at Medínah. Ill written.

The first page is more modern than the following ones; but of considerable age, as is manifest from the numerals in the inner margin, which shew that the second leaf is wanting.

It consists of a Moḳaddemah (Introduction), Twelve Gates (Báb) or Chapters, and a Conclusion (Khátimeh).

The Introduction begins with an account of the Egyptian calendar, followed by rules to find the rising, &c. of the planets:—Chap. I. treats of the knowledge of the signs (of the Zodiac), and the brilliant stars, and of the influential particles dependent on them. The sun, he says, is Sulṭán of the Universe, as the heart is of the body; and the moon is the Sulṭán's especial deputy; and 'Aṭárid (Mercury) his secretary, &c.

Jefr wa jámi 'li-Hazret 'Alí.

Jefr and *Jámí'* are the names of two skins on which 'Alí arranged the letters of the alphabet in a certain order, by means of which he and his successors were enabled to predict the fate both of body and soul.—Von Hammer's Encyklopaedische Uebersicht, S. 618.

There is nothing respecting which the Muslemáns are less agreed than this celebrated "Book of Fate."

"*Djafer Jami* of Aly, or Mystical Tables of the Khalif Aly; which are said to contain the future destiny of the Mohammedans; a MS. which must have cost an almost incredible degree of labour. It contains upwards of 800 pages, each of which is divided into 784 compartments, minutely written.

El Shimárikh fí 'ilmi-t-tárikh.—A Tract on Eras and Epochs, by El Imám, el Ḥáfiẕu-l himám, Jelálu-d-dín, 'Abdu-r-raḥmán, Al Suyútí. 8vo. Transcribed by Moḥammed ibnu-sh-Sheïkh Moḥammed, ibnu-l ḥáj 'Alí, el Aṭṭár, 29 Dhí-l Ḳa'dah, A.H. 1124=A.D. 1712. See D'Herbelot (Soiouthi), III. 334. This tract is not mentioned by him.

Kherídaïu-l 'ajáyib.—The geographical work of Ibnu-l Wardí. Folio. N.B. This copy once belonged to J. L. Burckhardt. It is a compendium much used in the East; and copies of it are to be found in almost all large libraries in Europe. It has been published in part, if not entirely, with a Latin translation, in Sweden; and there is a complete summary of its contents by M. De Guignes, in the "Notices et Extraits des Manuscrits de la Bibliotheque du Roi," II. 19, 60.

Al Ṭúsí Terjumeti Aḳlídis.

This MS. of Naṣírn-d-dín's Arabic version of Euclid agrees exactly with the edition printed at Scútari (Uskudár) in 1802; with the exception of the solution of the fifteenth proposition of the Twelfth Book, added by way of Appendix to that book. This copy appears to have been very carefully transcribed; and the figures have been corrected, or drawn over again, in several places.

Euclid's Elements, in Arabic, with diagrams, very neatly written, and in good condition. Uṣúlu-l Hindiseh wa-l ḥisáb li Aḳlídis Naṣíru-l-dín Ṭúsí's translation of Euclid. Transcription finished on the 15th of 20th Żú l-ḥijjah, A.H. 1199=A.D. 1785. Very clear and neat Ta'líḳ hand.

Mukhtáru-l ḥukum wa-muḥásinu-l Kulum.—The Wise Maxims of the Ancient Sages, by the 'Allámaïu-l aṣr el jámi 'beïn el ma'ḳúlwa-l manḳúl, El Sheïkh Jelálu-d-dín, el Soyúṭí. Transcribed

A.H. 618 = A.D. 1221. 8vo. or small folio. N.B. This author is not the celebrated Suyúṭí; as he died A.H. 911.

The date of this MS. is indistinctly written. The author begins by saying that he has extracted his maxims from books containing the moral aphorisms of Grecian sages, and the discourses of the wise in ancient times (p. 3). The first whose sayings are quoted (p. 5) is Sheït (Seth), called by the Greeks Úrání (Uranus?).

Ḥáshiyyah 'a-la sherḥhi-l hidáyet. Al Lárí's Marginal Notes or Glosses on the Commentary on the Hidáyetu-l ḥikmet, or Guide to Wisdom. See the fly-leaf.

This book contains:—

i. *Ḥáshiyyah 'ala sherḥi-l hidáyeti-l-ḥikmet, i. e.* Marginal States, by way of Commentary on the Guide to Wisdom.

A Treatise on Metaphysics, by Mohhammed Muṣlaḥu 'd-dín, al Lárí, transcribed A.H. 1144 = A.D. 1756.

This Hidáyah is probably that of Athíru 'd-dín al Mofazzal ibn 'Omar al Abharí. (See 2nd tract, p. 2.)

ii. *Sherḥi Hidáyah.*—A Commentary on Ibn 'Omar's Hidáyah, or Guide to the Knowledge of the Accidents and Causes of Things.

Nuska ibn tebl.—A Treatise on Physics, by Casmir; with a Commentary by Lari.

Dastúru-l'amel, i. e. "A Manual of Business," by a Hindú; as appears from the invocation to Rám, at the beginning.

It is entitled the *Badáyi'u-l funún;* and is divided into four chapters on different parts of arithmetic; beginning with the Hindú Periods, Padmas, Sank'has, Kalpas, &c. Its author was Gókal Dás of Dihlí.

Written in an indifferent Nasta'líḳ hand.

Ma'denu-l-ḥisáb (Mine of Calculation).—A Treatise on Arithmetic, by Bím Sing'h.

This book was wetted by the binder, and thereby made almost illegible in some places.

Muntakhabu-l kholáṣet.—An abridgment of the Kholáṣet-u-l-ḥisáb, by Sheïkh Baháu-d-dín Moḥammed Ḥoseïn; being a Compendium of Baháu-d-dín's "Essence of Arithmetic;" by Luṭfu-llah, the geometer, son of Ustád (Master) Aḥmed of Láhór, the architect.

'Ilmi Ḥisáb; Fársí. A.H. 1177.

Risáleh der'ilmi ḥisábi Hindí. An essay on the Indian Arithmetic, written by a Hindú, in the Persian language.

Transcribed and finished on Thursday, the 25th of Ṣefer, A.H. 1177 = Aug. A.D. 1762. Written in a clear hand.

Al Ṭúsí Terjumeti-l Majistí.

The name and titles of the transcriber are given in a Persian note by one of the possessors

of the book (whose name is expunged), in the fly-leaf at the beginning. An astronomical treatise, *Kitábi Majesti Khwajah Nasirul din al Tusi Nasiru-l-din Tusi.* Arabic translation of the Almagest, in a very neat Niskhí hand.

N.B.—This, though perhaps an abstract of Naṣíru-d-dín's work, is only a short compendium, very different from the Almajistí, which is a large work. There are on one of the fly-leaves some Persian verses, with the name of Maúla Moḥammed Sa'íd, the transcriber, and the date of Ṣafar, A.H. 1067 = A.D. 1657; but the date at the end is 1075 = 1666.

Risáleh Fársí Mulá 'Alí Kúshjí.—A celebrated treatise in the Persian language, on the Mathematical Principles of Astronomy, by 'Alí Kúshjí (*i. e.* The Fowler). The author was son of Ghayáthu-d-dín Jemshíd, according to Ḥájí Khalífah, in his account of the tables of Ulugh Beïg, but of Ḳází-zádeh er-Rúmí, according to D'Herbelot, (v. Zig Ulug Beïg, Bibl. Orient. iii. 613,) and the third and last of that prince's assistants in the calculation of his celebrated Tables (v. Hyde, Syntagma Dissertationum, i. 12). He is called by Hyde *(l. c.)* Máu-d-dín Samarḳundí. He flourished in the middle of the fifteenth century.

This copy once belonged to Miyán Sháh of Lakhnau.

Tenbíhátu-l Munejjemín.

"Astronomers' Memoranda" (from Sir Gore Ouseley's Collection), transcribed in the Niskhí character, in Shevvál, A.H. 1177 = April 1764; and compiled by Moḥammed Ḳásim, Munejjim Muẓaffer (head astronomer) of Abú-l Muẓaffer, Sháh 'Abbás al Hoseïní, al Ṣefeví, al Músaví (*i. e.* Sháh 'Abbás the Great) in A.H. 1031 = A.D. 1622. Its complete title (see p. 3) is Dirâyeṭi tenbíháti-l' Munejjemín; *i. e.* "The Science of the Memoranda of Astronomers." It consists of an Introduction, six Chapters, and a Conclusion.

Noz-haṭu-l Ḳulúb.

"The Delight of Hearts;" a miscellaneous work by Ḥamdu-llah al Mustaúfí; transcribed in Ṣefer 1192 = March, A.D. 1778.

At the end there is a long extract on the peculiar properties of man.

In the first page is the impression of Mr. Price's signet, "William Price, 1225" = A.D. 1810.

This copy was brought from Persia by the self-taught Orientalist, William Price, who accompanied Sir Gore and Sir William Ouseley to the court of Ṭihirán.

This book is divided into three parts:—1. The *Fátiḥah,* or Exordium. 2. The body of the work, in *Three Discourses;* and 3. The Conclusion (Khátimah).

The first part contains an Introduction and Preface (Muḳaddamah and Díbájeh).

The second part consists of three Discourses:—

1. On the Creation of Minerals.
2. On Man.
3. On Geography (principally of Persia).

The first part consists of an Introduction on astronomy, and a Preface on the inhabited quarter of the earth, and the longitudes and latitudes of places upon it.

The Conclusion, occupying only seventeen pages, gives an account of the wonders of the different regions of the world.

Ḥamdu-llah, el Mustaúfí, was also author of a celebrated history, entitled, Taríkh Gozídeh (The Select History).

He flourished in the first half of the fourteenth century, in the time of our Edward II. and III.

Risáleh fí-l Jaghráfíyá.

A System of Mathematical Geography, in Turkish, by Peter son of Baron, the Armenian Head Terjumán (Dragoman) of the Sicilians (*i. e.* the Neapolitan Embassy to the Porte): finished on the 22nd of Żí-l-ḥijjah, 1145 = 1733, 25th of May. Translated from the French of Monsieur Róbb (Robert de Vaugondy?), Privy Geographer to the French King (see p. 3), by Peter son of Baron, Head Dragoman of the Sicilians.

In a very neat but unusual Díváni hand, with three engraved plates.

At p. 13 there are plates giving the points of the compass according to the Turkish and Eastern seamen; the latter from the rising and setting of certain stars.

The Colophon is as follows:—

Tummet Terjumeṯu háżá-r-risáleṯi fí yedi-l'abdi-l ẕa'ífi-l muḥtáj ilẕ hidáyeṯi Rebbihi-l ḳadíri Bedrósa Veldi Báróni-l-Erminíyi fí-l yevmi-l s̀ání ve-l'ashrína min Żí-l-Ḥijjaṯi sherífaṯi li-seneṯi khamsi ve erba'ína ve mïaṯi ve elfi Vaḳa'a-hu fí beldeṯi Ḳosṭanṭaníyeṯi: ṣánahá Ta'alạ 'ani-l-áfát ve-l belíyeṯi.

"The translation of this treatise was completed by the hand of the feeble servant, who needeth the guidance of his powerful Lord, Peter, son of the Armenian, Bárón, on the 22nd day of Żí-l Ḥijjah the honourable, in the year 1145. It was done in the city of Constantinople; which may the Almighty preserve from disasters and injury!"

Lílávatí of Bháskara. Sanskrit.

A Sanskrit work on Arithmetic: part of the Lílávatí of B'háscara Áchárya, with a Commentary. It wants a few leaves at the end. In a good Dévanágarí character. See description annexed by the late Dr. Rosen, which has been reversed.

An English translation of it was published by Dr. Taylor, at Bombay, in 1816, with this title:—

"*Lilawati,* or a Treatise on Arithmetic and Algebra, by Bhascara Acharya." 4to. And another by Mr. Colebrooke at London, in 1817, with the following title:—

"Algebra, with Arithmetic and Mensuration, translated from the Sanscrit of Brahmégupta and B'háscara." 4to.

With such ready access and reference to acknowledged authority in science—such well-mounted powerful instruments—and such general convenience, the combination may truly be designated "Astronomy made easy."

§ 5. THE MUSEUM.

In the original arrangement of the mansion, the north side of the first-floor consisted of a long room called the Gallery, which was hung with pictures and Gobelin tapestry, of which last some still appears in the passage leading into the muniment-room; but, when so large a number of people as the French King's retinue amounted to were to be accommodated, this room was subdivided into a variety of small apartments, the partitions of which were standing when I first visited the house. Dr. Lee, however, restored the original arrangements, with the slight deviation of retaining a chamber of twenty-three feet long, by eighteen broad, at each end of the gallery, leaving the intermediate ample space which forms the present museum; and is sixty-six feet long, twenty-three broad, and thirteen and a half high, abundantly lighted by three projecting Elizabethan windows. The ante-room at the east end is enriched with an extensive collection of geographical and historical atlases, charts, maps, and plans, and numerous drawings, as well as engravings by the first artists of Italy, England, and France. The corresponding room at the other end of the museum is reserved for manuscripts, medals, and coins; and is not only the depository of Arabian, Coptic, Hebrew, and Sanscrit treasures, but contains also numerous family documents, some original manuscripts of the printed works of Dr. Lee's personal friends, and other literary curiosities.

The museum is appropriated to a miscellaneous collection of articles culled from the animal, vegetable, and mineral kingdoms; as well as antiquarian relics, and works of industrial art. Many of these were presents, and many have been purchased; but a large portion has accrued from Dr. Lee's assiduity when Travelling Bachelor for the University of Cambridge, nor has his acquisitiveness as a collector lain dormant since. The principal specimens are classified in sixteen large cases covered with glass, besides several smaller

ones, and an infinity of drawers and cabinets. The middle and most projecting bay, or oriel window, is assigned to the arts and sciences; the recess-walls being covered with portraits, and there are about a dozen casts of the heads of remarkable men. The glass-case in the centre contains various old mathematical instruments, as—astrolabes, quadrants, early telescopes, scales, dials, and drawing tools—shewing the progress of human ingenuity. Beyond this case stands an excellent specimen of brass wheel-work, being a large Orrery of the solar system going by clock-motion, which was made for Queen Caroline, wife of George the Second, whose portrait hangs in the dining-room: it was presented by her Majesty to the mother of the late Admiral Shirreff, who went with me to Hartwell when it was installed there.

It is not unnatural that a Director of the Society of Antiquaries should turn an earnest attention to the vases, Babylonian cylinders, encaustic and fictile idols, lamps, papyri, and other antiquities here collected; I shall not, however, detain the reader by a lengthy description of any but those of the ever-mystic Mizraim, and even that shall be in a separate section, so that it may be "skipped" at pleasure. An exception might be made in favour of a fine marble head, which the Doctor confided to my care at Bedford for some months. From its bearing the mitra, or Phrygian cap, and its youthful androgynous aspect, it possibly represents Atys or Paris; and it is remarkable as shewing the teeth, on a close inspection of the mouth, which are seen in but few busts. Poor Iarbus, *voce* Virgil, vented his indignation at Trojan heads—

> Et nunc ille Paris cum semiviro comitatu,
> Mœoniâ mentum mitrâ.

This bust was found among the ruins of ancient Tyre, and purchased there for a trifle by Dr. Lee, in 1811, of the Greek who found it; though even in this transaction it was necessary to obtain the intervention of the local Patriarch. It has been much admired by sculptors; and, on arriving in England, it was drawn by J. Martin, Esq. *(Belshazzar Martin)*, engraved by F. C. Lewis, and published in the Rev. Robert Walpole's work on Turkey and the East.

This is as accurate a representation of it, on a reduced scale, as Mr. J. Cobb, of Kennington, could cut for me:—

In hastily passing the Greek marbles, a mention should be made of those sent home from the Archipelago, expressly as a present to the Hartwell Museum, by my friend and former shipmate, Captain Thomas Graves. Of these, one is a white marble tablet, having a representation of an altar with fire on it, a sheep in front of the altar, and various persons attending the sacrifice; below which is an imperfect inscription. Near this sculpture stands an actual white marble cylindrical altar, about two feet high, and fifteen inches in diameter; it is ornamented with three ram's heads and a wreath of flowers, but the legend is much injured. Next to this is a marble tablet, inscribed with thirty-four lines of Greek, concerning ΥΙΟΝ ΜΕΝΑΝΔΡΟΣ. No. 3073 of the

Museum Catalogue is also a marble tablet, representing two figures in bas-relief, the female bearing a long torch in her right hand: this is of the best Greek sculpture, so much so, that my late excellent friend Chantrey borrowed it for many months. No. 1312 is a slab of white marble, on which are engraven eight lines, shewing that "Theodorus, son of Papius, son of Papius, during his lifetime, has erected this monument to Theodorus, son of Theodorus, surnamed Metrodorus, and to his children, and to Poplius *(Publius?)* and his descendants:—

ΘΕΟΔΩΡΟΣ-ΠΑΠΙΟΥ
ΤΟΥΠΑΠΙΟΥ-ΖΩΝΚΑ
ΤΕΣΚΕΥΑΣΕΝ-ΤΟ
ΜΝΗΜΗΟΝ-ΘΕΟΔΩΡΩ
ΘΕΟΔΩΡΟΥ ΤΟΥΚΑΛΟΥ
ΜΕΝΟΥ-ΜΗΤΡΟΔΩΡΟΥ
ΚΑΙ ΤΟΙΣ ΘΡΕΜΜΑΣΙ ΚΑΙ ΠΟΠΛΙΩ
ΚΑΙ ΕΓΟΝΟΙΣ ΑΥΤΟΥ.

No. 1294.—Ceres of Eleusis seated in a recess, holding a shield with her left hand, and a discus in her right; and No. 1295,—a beautiful female head in Pentelic marble, were brought to this country by Signor Athanasi. No. 3194 is a bas-relief which Dr. Lee procured at Athens in 1812, and, with his permission, it was engraven for the Rev. Robert Walpole's oriental collection: it had been found just before the Doctor's visit to Greece, and was much admired by M.M. Logotheti and Fauvel, then residing in that city. It represents a shepherd sitting, with a lute at his feet, among some goats and sheep which are feeding near him; and is probably a votive dedication to Pan.

There is a cut stone which was brought from Aleppo by the Doctor, the medallions and ornaments of which appear to be a favourable specimen of art of the time of Zenobia: and there are also various fragments of ancient and mediæval pottery, encaustic tiles, and ancient glass. Among what our loving neighbours, the French, would designate "sublimes bagatelles," is an Etruscan mirror, which was dug up at Canino, in Italy, under the immediate inspection

of Lucien Bonaparte, in 1829, near the tombs of the Etruscan kings; where it possibly may have been buried upwards of two thousand six hundred years. It has reflected more beauty than ever it can again.

Before quitting the classical department of the Museum, I should allude to a great loss which it experienced in 1848; and to which I cannot plead ignorance. This was the present which Dr. Lee liberally made to the Society of Antiquaries, of the ancient relics which he obtained by excavation in the island of Ithaca, in the year 1812, as detailed by him in the interesting narrative published in volume xxxiii. of the Archæologia, pp. 36—54. This gift withdrew from the collection—at one swoop—a magnificent flat silver patera, a tasteful silver cyathus, an exquisite little gold siren, a very perfect gold neck-chain, the fine-beaten gold leaves of a chaplet, some terra-cotta heads and pottery, and a remarkably bright-coloured glass vase; with some gold and silver rings and ear-rings, and many other exhumed spoils. As the event is of interest in the Hartwellianæ, I shall here commemorate it by an extract from the Society's Minutes for Thursday, December 7th, 1848; Viscount Mahon, President, in the chair:—

The following letter was then read from Dr. John Lee, F.S.A. addressed to the President and Fellows:—

"My Lord and Gentlemen,

"I take leave to express to you the gratification which I feel from the mark of approbation from the Members of your Council, who have honoured the humble description of my researches in Ithaca with insertion in the Archæologia, and also with the careful and exquisite engravings of the various articles thereby rescued from oblivion. I therefore have much pleasure in offering most respectfully to the Society, for its acceptance, these relics, thus described and figured, with the exception of an ornament, No. 13, which is not in my possession; and I hope that you will be pleased to permit them hereafter to occupy a space in your Museum.

"I feel persuaded that such articles will be better protected, for the inspection of future archæologists, under your direction, and be of more use to the public, than if retained in private hands.

"I have the honour to be, my Lord and Gentlemen,

"Your faithful humble servant,

"John Lee."

"*Hartwell, near Aylesbury, December 6th*, 1848."

The thanks of the Society were immediately voted for this valuable donation, and, Dr. Lee being present, the President expressed them to him in a short address.

We can now examine part of a large brick, given by Mr. John Barker, our late well-known consul at Aleppo. It had been sent to that regretted gentleman from Baghdad, and was considered valuable for the sharpness and high preservation of its cuneiform or arrow-headed characters. In these the celebrated Dr. Edward Hincks reads—"Nebuchadruchar, King of Babylon, the Beautifier, the noble or genuine son of Nebuchadruchar, King of Babylon;" and he dates the inscription at about six hundred years B.C. There are also fragments of brick and pottery of a later period, some of which have what is designated the maker's mark. But it must be recollected that it was customary among the Romans, in their brick buildings—such as baths, basilicæ, altars, pavements, &c.—to inscribe some of the bricks with the name of the laterarius, or the proprietor of the fornax where they were made. Tiles, lamps, urns, vessels, and whatever else was moulded by the potter, were marked with the stamp of the artificer, or of the owner of the property, these being often different individuals; hence such terms as *ex prædis*, *ex figlina*, *ex officina*, and many other instances which are of frequent recurrence in fictile antiques. For the sake of brevity, they often left out such words, and used only the genitive case of the proper name; of which numerous examples will be found in Raphael Fabretti's Book of Inscriptions.

Subsidiary to the antiquities, may be classed the carved weapons, paddles, and cloth of the South Sea Islanders; and the other arms, knives, implements, amulets, and articles of attire which appear in the miscellanea of the collection.

The specimens of the animal kingdom in this Museum are rather select than numerous; and the snakes and other reptiles, insects, and fishes are well preserved. There are the two extremes of large and small antelopes, from the Cape of Good Hope; and several of the birds from the same colony, presented by that indefatigable astronomer, Mr. Maclear, are new to ornithologists. Some of the serrated probosces of the saw-fish are unusually large, and the specimens of

that very ambiguous creature, the *ornithorynchus paradoxus*, or Platypus of New South Wales, are excellent. Besides the stuffed birds, the eggs, and the nests, there are several well set-up skeletons for comparative anatomy; which were prepared by Dr. Witt of Bedford. Appended to these is a large variety of shells and corals, from many parts of the globe; together with echini both fossil and recent.

In the vegetable world, a very useful hint might be derived from the attention here given to having wax or wooden models made of any fine, curiously-shaped, or anomalous fruits or roots which are produced in the surrounding grounds:—fac-similia of specimens worth preserving, but of too perishable a nature in themselves, thereby furnishing mementoes which may prove useful for subsequent comparisons. Such are the large Hartwell apples, the prize potatoes, and a fungus *(agaricus campestris)* found at Stone, of no less than eleven inches in diameter. Nor are these models entirely confined to this neighbourhood, as there are several casts of fruit and tuberous roots from Bedford; and among the more curious is the *encephalartus caffee*, or *zamia cycadiæ*, from Chatsworth, which bears several hundred almonds in a single cone.

The botanical department is also enriched with some fine talipot leaves from Ceylon, the nut called vegetable ivory, and a collection of sea plants. There are likewise the *zamia gigas* with its head and leaves, a state in which it is rare; and an enormous specimen of the *lycoperdon proteus*, or puff-ball, often used for fumigating bees.

The mineral cabinets are well stored with geological fragments of rocks, lavas, obsidians, agates, opals, chalcedonies, jaspers, asbestus, lignites, and various curious crystals, which rather require to be examined than described. But attention should be called to a few of the more singular or beautiful among them. The specimen which perhaps deserves to head the list in the mineral kingdom, as extra-mundane, is the black meteoric stone that fell at Launton, in Oxfordshire, on the 15th of February, 1830; because it long constituted one of the very few whose time and place of descent are well authenticated. This was distinctly seen: the light and explosion alarmed many people, as the noise was

loud enough to be heard even at Twyford, a distance of four miles. It weighs thirty-six ounces and a quarter avoirdupois, with a specific weight of 3·625, water being unity. The form is lumpy and parallelogrammatic, with the edges irregularly rounded off; and the surface is smooth, with a dull lustre. It is further described in my Cycle of Celestial Objects, vol. i. page 163. There are also some meteoric fragments which fell at the Cape of Good Hope in 1839, where they were collected by Mr. Maclear, who attends to all the phenomena of the southern hemisphere.

In the next place we may mention some crystallized metals, chiefly from the northern parts of Europe, such as the fine octohedral iron from Fahlun, and some splendid striated pieces of cobalt from the same country. The garnets, chalcedonies, opals, agate pebbles, and tourmalines are remarkable for selection; and there are many varieties of asbestos, as well as a fine specimen of Iceland spar. No. 219 of the Catalogue is a sample of the true horn-stone of Linnæus, but a new variety, brought by Dr. Lee from Sweden, and therefore named Leelite by Dr. E. D. Clerke, the well-known Professor at Cambridge: and, among the mineral stores, may be named some slices of the orbicular sienite of Corsica, brought by me from the Mediterranean; and which has since obtained the less descriptive name of *Napoleonite,* from the circumstance of its occurring principally near Ajaccio. There are also various specimens of the several strata composing the island of Sardinia, as well as those of Sicily, which last are chiefly from the Ætnean region, and consist of lava, obsidian, specular iron, scoriæ, and volcanic ashes and sand.

Next in order come the fossils, in which this collection is especially rich; for, independent of those from other parts of the British Empire, and from foreign countries, the *genius loci* has attracted an uncommon number and variety into the substrata of the Hartwell estate. Thus the limestone is actually so hérissée with conchological admixture, that not a building-stone is taken from the quarries without its containing univalves, bivalves, astreæ, and fragments of all sorts of marine exuviæ. The abundance of ammonites I have already mentioned (see pages 23—27), and here will be found some of those alluded to,

especially that supposed to be caught in the fact of devouring a crab: there are, however, evidences that the ammonites did not themselves escape assault, as well as that the smaller assailants had still smaller assailing them, so that the modern saw would have held good even in ante-diluvian times:—

"That lesser fleas have fleas to bite 'em,
And fleas bite fleas *ad infinitum!*"

Among the plants from the coal basins are neat stigmaria, sigillaria, calamites cannæformis, and other members of the flora of the carboniferous epoch; and the shales contain a profusion of leaves and stems of carbonized vegetables. The other English fossils consist of trigoniæ, echini, dentalia, pentacrinites, belemnites, terebratulæ, and encrinites; and the fossilized substance called septariæ is in large fragments. There is, moreover, the cast of a paddle of one of the plesiosaurian tribe, of a new variety. It was discovered in a bed of Oxford clay which crops out near Bedford, in the summer of 1833; and was modelled *in situ* by Mrs. Smyth. It is tolerably perfect, and measures forty-five inches in length, whence Dr. Buckland, on a close scrutiny, considered that the creature to which it was attached, must have been no less than thirty feet long. More of the relics were about to be moulded; but the bones of the corresponding paddle were stolen by the country-people in the evening, from their having seen the care with which the mould was made, and therefrom estimating a fanciful money-value. Besides the two paddles, there were also many of the vertebræ, and several yards away were indications of a head. An extraneous stony substance was found in contact with the back, as if of petrified flesh. Our good friend, Professor Sedgwick, who inspected the site, first pronounced this to be a new species of saurian reptile; and that it belonged to the lower part of the thick stratum in which it was imbedded.

Other interesting glimpses of former denizens of the earth are afforded by a complete ichthyosaurus about seven feet long, a perfect paddle of a larger individual, some vertebræ, the lower jaw of a teleosaurus from Whitby, and several other osseous fragments.

Among the specimens of petrified wood, are two thin slices from a fossil palm which I brought from Sardinia, and which is now in the Museum of the United Service Institution. This is sufficiently rare and curious to have excited the especial attention of Mr. Robert Brown, our celebrated botanist, and also of Dr. Von Martius, the botanist of Munich, as described in my account of Sardinia, page 76. There are also samples of fossilized wood found at Hartwell, in a stream impregnated with carbonate of lime: one is a monocotyledon, bearing an analogy to the palms and arborescent ferns, whence it was named *endogenites erosa*, by Dr. Gideon Mantell.

In concluding this section, we may remark, that, among the various specimens of building-stone and mineral substances of England, there is a box containing squared samples of the materials used in making that magnificent floating harbour, the Bute Docks, under my inspection, at Cardiff in South Wales. The box is of the timber from which the lock-gates are constructed, and the contents are—

1. Cornish granite, for piers and coping.
2. Sandstone, from the Forest of Dean.
3. Sandstone, from Newbridge, Glamorganshire.
4. Blue-lias limestone, from Lavernock, ditto.

§ 6. NUMISMATA.

Besides manuscripts, the square room at the west end of the Museum contains also, historically and chronologically speaking, one of the choicest of the Hartwell treasures; and this consists in the noble collection of ancient coins and medals therein deposited. There is, moreover, a large cabinet of excellent casts of celebrated cameos, intaglios, and other engraved gems of Egyptian, Persian, Etruscan, and classical art: it is fitted with drawers for the reception of four thousand four hundred specimens, selected from the best

collections in Europe, and disposed in order of time and style. Hence the reference to facts, dates, portraits, costumes, arms, and matters of taste, is at once most extensive and trustworthy.

A well-selected series of coins and medals forms the most appropriate and powerful adjunct which a library can receive; since they make an agreeable and faithful key to instruction for the student of the Greek and Latin historians, poets, geographers, and philosophers; as well in unequivocally certifying events and dates, as in illustrating ancient arts, emblems, and monuments without misrepresentation. It is true that a mere *furor numismaticus* may often exhibit the trifling acquisitiveness of sciolous enthusiasts; but such a possibility should never be allowed to tamper with the approaches to useful knowledge. The true antiquary will steer equally clear of a puerile attachment to, and an ignorant prejudice against medals,—feelings which have long formed the very Scylla and Charybdis of numismatology. Men of profound learning have found reason to regret a want of knowledge in medals, while very expert numismatists have often yearned for scholarship; yet, instead of rowing together, the man of dactyls and spondees holds the collector to be a trifler, and the latter returns his superciliousness by deriding the pedantic book-worm. Now in order to illustrate the progress of man from early ages, erudition and knowledge must unite their forces to arrive at satisfactory results: the one class may be consciously proud of inductive endowment, and the other value itself on perseverence and experience; but, as Sharon Turner has impressively expressed it,—"Intellect and industry are never incompatible. There is more wisdom and will be more benefit in combining them than scholars like to believe, or than the common world imagine. Life has time enough for both, and its happiness will be increased by the union." The argument in hand may be briefly summed up; for, though the writings, marble columns, and other public memorials of early ages, have suffered terrible ravages, many of the mutilations are supplied, and all former details illustrated, by the monies which have escaped barbarism. In numerous instances, these diminutive but infallible vouchers have outlived the states that struck them; and many are the once-

Sharon Tu

powerful cities, the emblems of which still appear in cabinets, that have long passed away—*ipsæ periere ruinæ!*

Dr. Lee's extensive numismatic treasures are arranged in six cabinets, two of which are filled with Greek coins and Greek-Imperial, relating to places visited by him during his travels in Spain, Italy, Sicily, Malta, Greece, the Ionian Islands, Egypt, Syria, Asia Minor, and the Greek islands. Many of these are extremely rare, as well as beautiful in design and execution; and all of them of such interest, that a published *catalogue raisonnée* of them would be a welcome boon to literature. There are excellent specimens of the Sicilian mints, and that of Athens; some fine tetradrachms of the kings of Syria, fair coins of the Arsacidæ, and the large concave and other gold coins of the Constantinopolitan emperors.

Those of Tyre and Berytus are in excellent condition, and the Greek-Imperial of Heliopolis, and other towns, having on them representations of temples and other buildings, are very valuable for their reverses. In alluding to the East, I ought not to omit to mention a well-preserved silver Jewish shekel, even though I consider it to have been struck at a period much later than has been argued for it by *Polyglot* Walton, Prideaux, and others, who have advanced assumption instead of proof. Looking, as I do, upon the shekels of early Scripture to indicate only a denomination of weight, and entertaining strong doubts as to any knowledge of the art of coining being possessed by the early Jews, it cannot have been struck, I think, before the time of the Seleucidæ.* The Hartwell specimen bears its name and denomination in Samaritan characters: on one side appears a branch with three buds, considered to represent the flowering of Aaron's staff, but by others held to be the hyoscyamus, or reticulated Egyptian henbane, which Josephus mentions as having ornamented Aaron's head-dress; the opposite face bears a gomor, censer, or

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* There are many shekels with square Hebrew letters, but they are all modern forgeries; a knowledge of which has led to the undiscriminating opinion that the Samaritan shekels are also spurious. It must have been under such an impression that the self-satisfied Pinkerton pronounces—"the admission of but one of them is rightly esteemed to be almost a disgrace to a cabinet." Heu!

sacrificial cup. The legend over the flower expresses, as I am given to understand, *Jerusalem the Holy;* and that around the censer, *half of the shekel of Israel, year* 2. The reading, however, of another friend, makes the latter,—*half for the use of the sanctuary.* To clear up so knotty a point, I here give an impression from the coin itself—

Among the Greek coins will be found samples of the united genius and taste for which the Hellenians were unrivalled; for their skill in symbolical representations, poetical imagery, exquisite finish, and spirited expression, cannot be surpassed. I must here, however, allude only to the principal object of their being brought together, namely, for geographical reference. Other sciences have also shared the collector's attention, though in a less degree; and there is a long series in illustration of Astronomy, both ancient and modern, among which the celebrated zodiacal rupees must not be forgotten.

We will now take a cursory view of an historical series—one in the collection of which I have been unusually interested.

In the centre of the room stands a commodious old library table, the drawers of which are devoted to articles and references for forwarding numismatic study. This table also forms a pedestal to a beautiful cabinet from the well-known hand of Roberts, in the exact form of the Temple of Janus. It is twenty-one inches high, eighteen deep, and fifteen broad; having twenty-five sliders pierced with forty compartments each, making space for one thousand medals; with a deep drawer for a catalogue at the bottom, and a secret locker at the top. It is composed of mahogany, inlaid with other woods, and the principal front is decorated with two columns *in antis,* which are made of a very hard wood from a part of the Strait of Magellan, named by my friend

Captain P. P. King, Hartwell Island; it is situated in Smyth's Channel, another of the designations of his arduous survey of those parts. The wood was brought home by Captain T. Graves, then a lieutenant under Captain King, in my old ship the Adventure; and it arrived just in time for a sample of it to be thus enshrined.

While employed in the Mediterranean, and having always been strongly imbued with historical recollections, I could scarcely fail of acquiring a warm numismatic and antiquarian bias. At first my medallic collection was pretty general, though with a partial leaning to the Greek mintage. As I advanced, I was struck with the importance of the Roman large-brass series, seeing that in date and circumstance they must approximate closely to truth, since they were not, as with the gold and silver, struck by the emperor's private will, but by a regular and formal *senatus consultum.* Added to this, the evident fidelity of their portraits, the importance of the transactions represented, and the masterly brevity of their expressive legends, induced me to secure good impressions wherever I could fall in with them, even by exchanging away all the gems of my other series. With some years of application, under highly favouring circumstances, I was singularly successful; as is evinced in my Descriptive Catalogue printed at Bedford in 1834. On retiring to that quiet town with the three-fold object of completing the charts and plans of my Mediterranean survey, educating my young family, and inquiring into sidereal laws, the *res angusta domi* precluded my having more *fancies* than one: the large-brass, and rare numismatic works, therefore, gave way before astronomical instruments of power, and the erection of an observatory. On the six hundred medals here alluded to being passed over to Hartwell, Dr. Lee resolved to increase them to one thousand; and, from those collected in his travels, and those secured by taste and perseverance, he has all but accomplished it. Hence the beautiful assemblage before us.

The array commences with Julius Cæsar, the head and front of the empire, and terminates with Gallienus, whose family closed it; as the reigns after the advent of what are conventionally termed the Thirty Tyrants—there were

seventeen of them—constitutes the Lower Empire of historians: and, singularly enough, at the end of the earlier emperors, the legitimate large-brass coinage also concludes. The period therefore embraced is from B.C. 43 to A.D. 268, or three hundred and eleven years; a brief but wonderfully important span in the world's history. It is replete with the sort of moral vicissitudes which mankind then underwent; many of which are traceable on the medals before us. By these hackneyed yet faithful chroniclers, assigned to their proper date and circumstance, we can ascertain, with unquestionable certainty, many of the deeds of each of the sovereigns, their titles, accessions, progresses, victories, triumphs, largesses, deaths, and apotheoses; while their portraits are stamped with strong inferential testimony of being authentic likenesses. A detailed account is not the object of these pages, but some very interesting instances may be hastily pointed out.

The comet which appeared when Cæsar was killed is duly commemorated; and there is a very fine copy of the medal struck by Augustus on redeeming the Roman prisoners from Parthia. *Admiral* Agrippa appears with the device of Neptune. There is also that coined when Tiberius afforded relief to Asia, on thirteen cities having been destroyed by a terrible earthquake: but though the Senatorial authority *(Senatus Consulto)* under which the brass medals of imperial Rome were struck, was a means of maintaining a staid propriety in the emblems and legends, still it could not prohibit obsequious flattery,—hence the same mint which immortalizes the liberality of Tiberius in remitting the taxes on Asia, also hands his *Moderation* down to posterity. The German campaigns of Drusus and Germanicus are enrolled, as well as the civic service of Claudius, and the founding of Ostia and closing the Temple of Janus by Nero: so also are unerringly recorded the acts of Vespasian in re-establishing order in Rome, the conquest of Judæa by Titus, the various stages of the secular games under Domitian, the abrogation of taxes by Nerva, the legislative and benevolent transactions of Trajan, the travels of Hadrian *(Locupletatori orbis terrarum)*, the creditable deeds of Antoninus Pius and Marcus Aurelius, the gladiatorial combats of Commodus as the Roman Hercules, and, indeed, the expeditions

and leading acts of all the emperors down to the rupture of the empire. In contemplating these undying memorials, the ingenuity of device and excellence of workmanship are strikingly admirable; and we are reminded of the truth of Addison's remark, that we "may often find as much thought on the reverse of a medal as in a canto of Spenser."

Though in a secondary degree, we somehow like those records best which bring distinct incidents home to ourselves, even though they bear evidence to our former subjection. But, without historical interest, a nation's career must, till time has stamped it, be comparatively spiritless and monotonous; and thus even memorials of defeat testify that a struggle for liberty was made. A country may be energetic, and boast its commerce and steamers, its canals and railways; but, if destitute of great recollections, the heart can neither be properly affected nor elevated. Now this cabinet contains specimens of singular interest to our own country's story, as referring to the visit of Hadrian, the favour of Antoninus Pius, the advantages gained by Commodus, and the campaigns of Severus and his sons, Caracalla and Geta. On this valuable sequence, and especially those coins which bear the type of Britain, I cannot but express my dissent from a strange heresy which has very recently obtained among some collectors; it would not, however, have been here noticed, but that it has gained a station in the "Materials for the History of Britain," printed at a serious public expense. In that national work, inference is allowed instead of demonstration: after enumerating the Roman Britannias in the British Museum, and some of these in the cabinet before us, it is said that the sedent figure does not symbolize Britain, but represents Rome sitting on British rocks, adding,—"It is not likely that the Romans would personify a conquered country with the military insignia of the conquerors." Now it requires no great assurance to pronounce at once that this opinion cannot be sustained; and that the conquerors declined conceding military insignia to conquered provinces when resistance was over, is not at all a correct inference, if the symbols of Dacia, Pannonia, Cappadocia, &c. are to be received in evidence. In the period under discussion, Roma is always represented as a female in Roman attire; and, whether standing or sitting on spoils

of war, is galeated, and distinguished by the palladium, the hasta-pura, or the parazonium,—but never, to the best of my recollection, with a standard. She is, moreover, very tastefully draped, wears the strophium or breast-girdle, and has her right breast, arms, and legs bare: thus—

In my Descriptive Catalogue of Roman Large-Brass Medals, I inadvertently styled this an Amazonian female—*Amazonis, sive Heroinæ*, being a common designation among medallists; but she certainly has not the revolting mutilation which distinguished the bust of those ladies. Still the helmet recalls the taste which induced the fair of the Eternal City to fence and fight, and even to appear in the bloody arena for hire: well might the contemporary satirist indignantly ask—

Can helméd dames have any sense of shame,
Who ape the man, and their own sex disclaim?

Not, however, to dilate upon a digression, the reader is referred to Juvenal's sixth Satire; and he will soon bless his stars that we are now happy with what Barnabas truly calls, "female women."

Such is Roma; whereas Britannia appears mostly as a warrior at rest, in a Gaulish attire with a closely-dressed head, wearing the *braccæ*, or trowsers, so distinctive a token of a cold-climate people. The province was probably thus symbolized on obtaining the full privileges of a garrisoned colony: but a mere inspection will at least shew to any competent antiquary, that the man here represented, be he what he may, cannot have been intended for Roma. As I

happen to have by me the wood-engraving of the cast which the late Mr. R. Thomas allowed me to make of his fine medallion of Commodus, now in the British Museum, it shall here be placed before the reader *—

Among other medals of importance in historical chronology, those struck by Philip, on the fifth celebration of the Secular Games, deserve particular mention. It will be recollected that this semi-barbarian murdered the younger Gordian, who had made large preparations for that splendid pageant: and, among other matters, had collected together no fewer than thirty-two elephants, ten tigers, ten elks, sixty lions, thirty leopards, ten hyænas, one hippopotamus, one rhinoceros, forty wild horses, twenty wild asses, and ten camel-leopards, with lots of deer, antelopes, and gladiators. Philip, on this occasion, struck medals in honour of himself, Otacilia his wife, and Philip Junior his son, under the legend *Sæculares Augusti;* the reverses of which represented the lions, the stags, the antelopes, the elks, and the hippopotamus—evidences of the games. But the most interesting medals then minted are the *Romæ Eternæ*, *Milliarium Sæculum*, and *Sæculum novum* of Philip's own series; since they shew, as I have

* Pinkerton, habitually caustic and growling, always belabours those who advance opinions upon what he deems slight grounds, and calls them all sorts of names; but now and then he nods himself. Thus, in describing a fine coin of Queen Christina's, bearing a draped female holding out a patera, with BRITANNIA on the exergum, he, recollecting how highly British pearls were prized, asserts that the lady is wielding a "basin," the which "appears to contain pearls." This is peeping into a representation with a vengeance!

elsewhere said, the correctness of the vulgar era of the building of Rome over that of Sir Isaac Newton, which last docks one hundred and twenty-five years from the age of the imperial city. Not only are the Consular Fasti and the centennial festival in accordance upon this point, but a third evidence is cast into the scale by the remarkable solar eclipse which happened at the coronation of Gordianus Pius, and which was so completely total that torches were used in the streets of Rome at mid-day.

Besides the effigies of the emperors, the cabinet also exhibits a rare collection of their empresses and children, from the two Julias—wife and daughter of Augustus—down to Salonina, the wife of Gallienus, and their son, Saloninus. Here the Agrippinas, mother and daughter, excite very different recollections; while the dignified Livia and the prudent Antonia attract respectful attention. Domitia (the patroness of Josephus), and Julia (the daughter of Titus), are well represented; and the coins of Plotina—*summa honestate et integritate fulgens,* —with those of Matidia and Marciana, the excellent ladies of Trajan's court, are in singularly fine preservation. The heads of Sabina and of the Faustinas exhibit such tasteful elegance in the hair-dressing, that we are somewhat startled at the falling off in this respect, when we examine Julia Mæsa, Tranquillina, and Herennia Etruscilla; but fashion and taste are not necessarily connected. The reverses to the medals of Roman empresses usually bear very appropriate symbols, and the legends—as *Venus Victrix, Veneri Genetrici, Junoni Lucinæ, Matri Castrorum, Lætitia, Pudicitia, Fecunditas, Hilaritas,* &c. —are pointedly significant.

But I promised not to be diffuse, however tempting these matters may be: I shall therefore only add, that besides the produce of ancient mints, that of modern ones also has been attended to. Among the circulating media of various countries, the large and weighty square coppers used as coin in Sweden, may be contrasted with the light paras of Turkey. Mingled with the more recent medals, is a collection of those of distinguished men of our own and foreign countries. And this department of art must be concluded with the simple commemoration of an event, from the burin of Mr. Stothard,—

Obverse.—The profile of Dr. Lee, regarding the right. It is an accurate and excellent likeness.

Reverse.—Across the field, this legend—

NUMISMATIC
SOCIETY
OF LONDON
FOUNDED DEC. XXII.
MDCCCXXXVIII.

IOHN LEE, LL.D.
F.R.S. F.S.A. F.R.A.S.
PRESIDENT.

§ 7. EGYPTIAN ANTIQUITIES.

We now approach an important department of the museum; one that is rich in a class of relics which are of singular value to the historian, the chronologist, the scholar, and indeed to every person of education. Being moreover personally interested in the wondrous revealments lately made by the Egyptian researches, and following the impulses of both duty and inclination, I must here be allowed to expatiate rather discursively; but the hasty or uninterested reader has the remedy mentioned on page 136.

The land of Mizraim—a dual word, which has been considered by Hebraical philologists as applicable to the space comprehending Upper and Lower Egypt, the residence of the descendants of Ham—had remained a wonder and a mystery from the most remote ages; the only elucidations to its monuments being through the ponderous tomes of Kircher, and the suppositions of Biblical commentators, pedantic mystagogues, and unqualified travellers. These attempts to lift the Isiac veil, it is true, were attended with many advantages to public information; but we still talked about Pompey's Pillar and of Cleopatra's Needles, of Moses and Aaron's having built the Pyramids, and of the whistling Memnon; nay more, while some viewed the sacred legs of the Ibis in the common hand-

plough of *picture-writings*, other sages perceived an indication of the mariner's compass in the mystic Tau, the symbol of eternal life, and a still more inducted set believed the pyramids were erected for squaring the circle! Such were the fruits of the patient and often frivolous industry of former schools; old Greek authorities, and classical puerilities, were ransacked with greater zeal than judgment, and erroneous conclusions thereby stamped with factitious erudition.

This was the state of our knowledge—so to speak—till the French and English expeditions to Egypt, at the commencement of the present century, opened the road which has since that time been so successfully trodden, that the darkness which had hitherto obscured the records of that most interesting country is dispersing, and even affords a promise of being gradually dispelled. There had existed much diversity of opinion in the learned world upon the subject; at length the arrival of the celebrated tri-grammatic Rosetta Stone in England, in February, 1802, afforded a key to the lost literature of ancient Egypt. This invaluable relic bears three inscriptions, the upper of which is in the Hieroglyphic or sacred character; the middle one in the Enchorial, Demotic, or civil letters; and the lower one is written in Greek. The inference that these related to one and the same circumstance, at once struck its French captors; yet almost vain and fruitless were the exertions of MM. Sacy, Akerblad, and other savans of the local Institute, in attempting the unravelment, as they only identified some parts of the enchorial inscription. It was therefore reserved for the erudition and powerful sagacity of my friend, the late Dr. Thomas Young, to give the clue, and thereby "to convert to permanent profit, a monument which had before been a useless though a glorious trophy of British valour."

The date which Dr. Young assigned to the Rosetta Stone was the 27th of March, 196 B.C., according to the proleptic Julian reckoning; but the learned Dr. Hincks has recently shewn, pursuing the same computation, that the date is actually the 27th of March (18th Mechir), 197 B.C., a year which was proleptically bissextile. This very re-examination affords a substantial proof of the integrity of Young's system.

The torch thus lighted now passed into the able hands of Champollion the Younger, who possessed assiduity, accuracy, method, in short everything but temper, for applying the newly-found key to the portals of Isis. Under this energetic explorator, the efforts of scholars in various parts of Europe, and the untiring enterprise of numerous intelligent travellers, the obscurity which involved the records on the monuments of Egypt has been penetrated, and though as yet but too slightly, still with results beyond the expectation of the most sanguine: nor must it be forgotten, that Mr. Salt was among the foremost in finding out that the elliptical ovals, now termed cartouches, contained proper names.* And it is also flattering to our national character to know, that, of the travellers alluded to, the majority are English; and I certainly have some personal gratification in naming my excellent friends W. R. Hamilton, Colonel Leake, the Duke of Northumberland, Dr. Lee, Sir Gardner Wilkinson, and Mr. Bonomi. Our late Consul-General Mr. Salt, Signor

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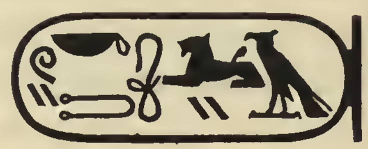
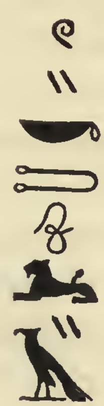
* As cartouches, and the manner of reading them, are new to the generality of readers, it may be well to give an illustration by which they may be comprehended; and the instance shall be modern. While these sheets are in the press, Dr. Lee has raised an edifice over the Hartwell Spring mentioned at page 41; a view of which will form the tail-piece to this chapter. It is erected in the Egyptian style, from a plan by Mr. Bonomi, with inscriptions after the sacred hieroglyphics of the Mizraimites by Mr. Birch, of the British Museum. In the line along the pediment, is the annexed cartouche, to be read as follows:—





A twisted cord	V
Two oblique lines	I
A cup	C
A collar	T
A knot	O
A lion	R
Two oblique lines	I
An eagle	A

Belzoni, and—however strange the conjunction may appear—the Consul-General for France, Mons. Drovetti, have severally aided my inquiries in Egypt.

By the persevering application of the means above mentioned, the glories of the Pharaonic times, together with the material civilization of a people many ages before Moses was born, are partially revealed, and may yet be brought out into full light. Mankind now perceive with astonishment that the Greeks and Romans, the *ancients* of our schools, shone chiefly in borrowed colours; that the trinal unity and the immortality of the soul were taught in Egypt, long before they were even dreamt of elsewhere; that a high degree of refinement and luxury pervaded the valley of the Nile while Carthage, Athens, and Rome were still unthought of, and barbarism yet enveloped the western world; and that the Egyptians had cultivated geometry and astronomy, as well as practised manifold branches of philosophy, more than two thousand years before Socrates cross-questioned Theæatetus as to what Science consists of. Their unquestioned priority in inventing and diffusing the inestimable art of writing, also entitles them to our highest respect; moreover, we have decisive evidence of their degree of progress, perhaps above four thousand years ago, in the mechanical and manufacturing crafts, whether in constructing ever-durable monuments, or their proficiency in mining, smelting, pottery, glass-blowing, weaving, dyeing, and making tasteful articles of furniture.

The social system of the Egyptians was as much advanced as the reverence to laws considered immutable, and their patriarchal notions of freedom, permitted. The whole community was divided into castes, or rather classes, for the condition appears to have been unaccompanied by the strictness or austerity of Hindustan. The highest caste, although there was a sovereign of limited authority, consisted of the sacerdotal order; who, uniting the worship of the Deity and the cultivation of intelligence, held the chief offices of the state, besides being also the judges, physicians, and architects. To this theocratical class or government of priests succeeded the army, which, from an almost inconceivably distant period, had been regularly established and divided into regiments, each bearing its peculiar standard and emblem. The soldiers were

armed either with the sword, battle-axe, spear, bow, club, or sling; and they marched to the music of timbrels, cymbals, drums, trumpets, and other instruments; but, though they paid scrupulous attention to their chariots and war-horses, there is no example of a mounted soldier, or cavalry of any description. After the troops came the husbandmen; and then followed the artificers and tradesmen of the towns. In each of these castes, the rights of the female sex were more honoured and observed than in the social system of any other eastern nation, the Israelites not excepted.

Under this primitive form of government, the whole population of Egypt was divided into three distinct classes—the priests, the military, and the populace;—an arrangement whereby, it is not improbable, the two privileged classes were able to hold the third in subjection. Champollion, looking upon this as an unavoidable condition, and that opinions upon the subject may be as various as the countries where they are given, concludes,—"In fact, there is in a theocratic government the chance of religious despotism; in a monarchy, the chance of a military despotism; in an aristocracy, or oligarchy, the chance of a feudal despotism; in a republic, the chance of a democratic despotism—everywhere a chance of oppression. The relative good will be where these several chances are most limited."

But though no virtuous Egyptian seems to have been debarred from civil rights in this world, nor eternal happiness in the next, the social institution was certainly blotted with a degraded caste, which included herdsmen, poulterers, fishermen, weavers, and servants. Numbers of these, as well as the slaves, and the unfortunate captives who fell into their hands, were doomed by their sacerdotal task-masters to employ their lives in working the mines, and in building pyramids, temples, and other colossal structures. Moses—who was so intimately acquainted with that House of Bondage—pathetically records what hard and rigorous overseers the Hebrews found the Mizraimites to be:—"And the Egyptians made the children of Israel to serve with rigour. And they made their lives bitter with hard bondage, in mortar, and in brick, and in all manner of service in the field; all their service wherein they made them serve

was with rigour." It is to be feared that, if the unhappy Fellahs of the present day, in that country, leave a memorial for posterity, it must be couched in the same terms.

The religion of the "brain-sick" Egyptians has borne the finger of scorn for many ages; and their idols were denounced in Holy Writ. Cicero also indignantly asks,—"Do not the Egyptians esteem their sacred bull, their Apis, as a Deity?" and then answers the question himself:—"Yes, by Hercules! as certainly as you do our protectress Juno." Juvenal, who said that they "worshipped everything but virtue," bitterly opens his fifteenth satire, to Volusius Bithynicus, with a broadside upon the gross and debasing superstition into which they had fallen—

> "Who knows not to what monstrous gods, my friend,
> The mad inhabitants of Egypt bend?—
> The snake-devouring *ibis* these inshrine,
> Those think the *crocodile* alone divine;
> Others, where Thebes' vast ruins strew the ground,
> And shatter'd Memnon yields a magic sound,
> Set up a glitt'ring brute of uncouth shape,
> And bow before the image of an *ape!*
> Thousands regard the *hound* with holy fear,
> Not one, Diana; and 'tis dangerous here
> To violate an *onion*, or to stain
> The sanctity of *leeks* with tooth prophane.
> O holy nations! Sacro-sanct abodes!
> Where every garden propagates its gods!"

And Lucan assures us that, on entering "a splendid temple, every part thereof glittering with gold and silver, you look about for a god, and you find a stork, an ape, or a cat." These sarcasms, however, which convey more humorous invective than argument, especially from professed polytheists, must be taken *cum grano salis.* The debasement into which the Egyptians had fallen in Roman times, appears to have been of a sufficiently dark and fearful character; but we still require from those people themselves the means of knowing what is assignable to pure worship, what may be reckoned among mere symbolical

rites and ceremonies, and what was intended only to fix ideas which otherwise might have proved transient. Strong glimpses of an earlier and holier faith may be traced; though they appear to have thought it insufficient to entertain mere mental notions of the being and attributes of the Living and True God, but endeavoured to materialize divine truths by visible mystic emblems. The stately monuments of Egypt, whether of the Pharaohs or the Ptolemies, conspicuously bear the winged globe—emblem of the Eternal—surrounded by two serpents, symbolical of the Logos, or wisdom. A more immediate evidence of the "triplasios" doctrine of the Egyptians is in their worship of Osiris, the general father and active principle of all things; Isis, the universal mother; and Horus, their son, the manifestation of their combined energies. Their faith also in the immortality of the soul, and a final resurrection, though clouded with a variety of metempsychoses, is too obvious to admit of question. Herodotus mentions as a known fact, that they were the first who assumed these principles; and St. Augustine himself says, the Egyptians had a better idea of the resurrection of the body than any other people.

The images of the Egyptian deities were not supposed originally to represent real beings, but to indicate abstract virtues, senses, and dogmas,—mere emblematical expressions of the Monad, the one sole omnipotent Being. Such allegories would readily be liable to become themselves objects of ignorant adoration. The twisted lock of hair, and the ram's horn, are always typical of divine unction;—the horn, indeed, was generally an emblem of power, as can be inferred from various passages in the Old Testament. Then came the compounded deities, which, as well as men with heads of animals, and animals with heads of men, were unnatural combinations; but all these monstrous images were intended to convey some metaphorical, symbolical, or mystical signification. The Great God was typified by Amun, or Ammon, a human body with a ram's head, holding in his left hand a sceptre, and in the right the sacred crux ansata, an emblem held by nearly all the Egyptian divinities: it is usually called Tau, from its resemblance to the Greek τ, supposed to have been the symbol of vital energy and eternal life—yet designated by many

the Key of the Nile. Amun or Amun-Ra *(Jupiter)* is seated in token of stability; two tall plumes or rows of feathers surmounting a globe generally decorate his cap, and very frequently there is a serpent or serpents, as indicative of supremacy. In unravelling the meaning of these significant types, certain gleams of accepted attributes of creation, preservation, and destruction crop out; as in the great triad of the Hindoo, or contemporaneous system of polytheism. The following barred appearance of the *tesher*, or head-dress, is a more unusual type—

The Egyptian pantheon was crowded, for those people associated every mundane benefit with nature and religion; but through all types and symbols they seem to have recognised an omnipotent and universal Spirit of Providence.

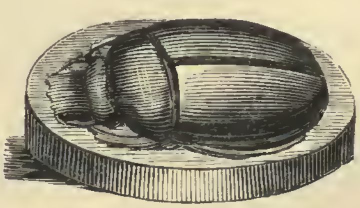
Neph, Knouphis, Knoubis, was a deity of the highest rank, as the name, still used in Arabic, implies. The great gods were Neph, Amun, Phthah, Khem, Saté, Maut, Osiris, Isis, Bubastis, Neith, and others of what an angry critic calls the

"Demon herd:" one of these generally formed, in conjunction with two others, a triad, which was tutelary to a particular district. These were distinguished by their costume and attributes. Osiris *(Pluto)* holds in his right hand a crook, or crosier, and in his left the flagellum, or scourge, indicating the discipline which he exercises over his people. His office was to judge the dead; and, as an attribute of the divine goodness of the Deity, he was clad in pure white only; he wears on his head the cap of Upper Egypt. Phthah *(Vulcan)* was the demiurge or creative power of the Deity, and therefore leader of the mundane artisans. He is called the "Lord of Truth" in the Memphitic legend; the scarab was sacred to him as well as to the sun; and he holds the emblems of life and stability, with the staff of purity. Thoth *(Mercury)*, the first Hermes, known in hieroglyphics as Lord of Pautnouphis, patronized the arts and sciences; he was secretary to Osiris, and to him the Egyptians ascribed the invention of letters. Isis wears on her head the well-known disc and horns, as does also her good sister Tsonenofre, who is the second person in the Ombite triad. Horus *(Messiah, Mithras, Apollo)*, typified the sun in Egypt, Palestine, Persia, and Greece; he has the short dress called shente, his head was bound with the strophium, or fillet, and the hawk was his exclusive emblem. Osiris, Isis, and Horus are very frequently met with as a triad in greenish blue porcelain, alabaster, and sycamore wood,—as are also numerous statuettes of Isis suckling the infant Horus. It was a peculiar duty of Horus to introduce the souls of the dead into the presence of Osiris, after they had passed the ordeal of their final judgment.

The *Ibex religiosa*, or Sacred Ibis, a bird of the genus Scolopax, consecrated to Thoth, was revered in every part of Egypt. St. Paul probably alludes to the Ibis, in Romans i. verse 23; and it is among the abominations in Ezekiel's vision. It was peculiar to the Valley of the Nile, strongly regarded by the people in life, and honoured with a public funeral after death. Plutarch—*de Iside et Osiride*—considered that the Ibis was merely held to be an emblem of the Moon; but, even were this the fact, it must have been very secondary in that light to the cat-faced Bubastis. It was popularly renowned for destroying

serpents, scorpions, and locusts; hence Juvenal's "illa pavet saturam serpentibus Ibin:"—

Another object or symbol of worship, seen everywhere, is the well-known Scarabæus, or Sacred Beetle, respected as typifying the Anima Mundi, or divine spirit, pervading and cherishing all things. In my Description of Sicily, page 186, I mentioned the mechanical exertions of the scarab in removing loads several times its own bulk; and I have also watched their strength and perseverance in the sands of Barbary and Egypt. They became very conspicuous in the mythology and symbolic language of Mizraim, insomuch that the representations of them seem to have been in universal request. When found on the bodies of mummies they are held to indicate that the deceased was of the sacerdotal order: as on that of Horseisi, in the museum of the Royal College of Surgeons. Myriads of pebbles were cut into the shape of this beetle, and they appear to have been generally worn as talismans; the under surface



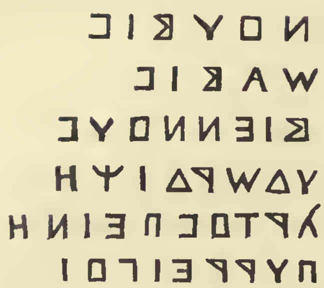
was often covered with figures engraved in intaglio, whilst many represented

the solar, lunar, and astral emblems. Jablonski describes the scarab as the Egyptian symbol of the everlasting and universal soul, and says that its temple is the equinoctial circle—the upper hemisphere; hence it was also styled the despot *(τυραννος)* of mid-heaven. In the Hartwell Museum numerous specimens are preserved, of various dimensions, and several distinct methods of sculpture. The wing-cases in most instances are smooth, and in others they are variously striated; still it is difficult even for an entomologist to pronounce on the beetle intended to be represented, since the six hundred species enumerated by Gmelin are chiefly recognizable by their antennæ and legs, which are entirely omitted in these figures. They mostly resemble, however, the Stercorarius and the Sacer. As to the βρουχος of the Septuagint, it is variously rendered.

These mystic stones were prohibited by the Mosaic Law; but in later ages they were said to be made by Solomon, and invested with cabalistic properties, for the use of the Children of Israel. From the far Levant, it seems, they crept into Greece; and when the Romans became prepossessed in favour of Mizraimite idolatry, these amulets multiplied almost to infinity, so that multitudes in Trajan's reign began wearing effigies of the Egyptian gods on their finger-rings. About this time, Basilides, the rampant Tractarian of his day, opened the trenches of Manicheism, by insidiously foisting some of the Gnostic tenets into the doctrines of Christianity; and the talismans, with fantastic additions, were readily made subservient to the self-sufficient philosophy which granted the supreme and all-perfect Deity the aid of Æous, and a host of inferior beings. Hence originated the misuse of the well-known Abraxas, or Abrasax, a name which some would fain derive from αβρος *(beautiful)*, and others from the numeral value of the Greek letters α β ρ α ξ α ς, which, being added together, give three hundred and sixty-five. But Salmasius and Basnage maintain that it is a purely Egyptian word; and the conjecture is strengthened by its barbarous cognate, "Abracadabra"—the noted ancient phylactery for fevers —being written in the form of a pyramid. It should be noted that the class from whom the Gnostics—so designated from γνωσις *(knowledge)*—claimed their origin, were admired for their talents and virtues; but the follies, heresies, and

strange abominations of their followers have since rendered the name everlastingly infamous. Their opinions are supposed to be alluded to by St. Paul, in his Epistles to Timothy and Titus, as the "profane and vain babblings and oppositions of science falsely so called."

While I was employed in the Gulf of Syrtis, our Consul at Benghazi, Signor Rossoni, procured a Basilidean gem from an Arab, who had found it among the ruins of Grennah *(Cyrene)*. Of this the Consul presented me with an impression in hard wax; and he appears to have also given one to Dr. Della-Cella, who visited the Cyrenaica with the Pasha's army in 1817, on which occasion I met him on the route. Both Rossoni and Della-Cella were agreed in the representation being that of the winged dragon, "guardiano degli Orti Esperidi;" the site of the celebrated Gardens of the Hesperides being sufficiently near to warm their imaginations. But as this sorely puzzled a Quarterly Reviewer (vol. xxvi. page 225), the matter will bear re-touching. The critic says,—"We must observe, however, that the sculptor had certainly an odd notion of a winged dragon: it appears to us, with reverence be it spoken, more like the marine animal which inhabits the shell well known to school-boys under the name of periwinkle, without its cap; and as to the Greek inscription, which might throw some light upon the subject, we must be content to leave it, with Signor Della-Cella, to the Archæologists." Now the so-called dragon is, as annexed, a lion's head with solar rays, united to the body of a serpent, a type of the Ophite worship which once so unaccountably and extensively prevailed. In Cyrene, a district comparatively close to Egypt, it may have been considered emblematic of the destroying and preserving attributes of Knouphis, or Noub; but the inscription on the reverse is not so great a puzzle as the Doctor's "caratteri" makes it to be, for though written "con molti arcaismi," it is neatly cut. He adds, "e tutto invita gli Archæologi a rivolgere sopra di essa le loro cure." Such a call was hardly necessary, for it is thus easily made out:—

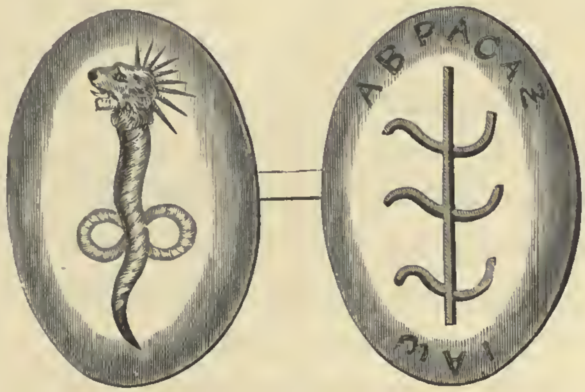
On the Gem.	Modernized.	English Reading.
	ΝΟΥΒΙC	Noubis.
	ΩΑΒΙC	Oabis.
	ΒΙΕΝΝΟΥC	Biennous.
	ΥΔΩΡΔΙΨΗ	Water for thirst.
	ΑΡΤΟCΠΕΙΝΗ	Food for hunger.
	ΠΥΡΡΕΙΓΟΙ	Fire for cold.

The exact meaning of the three names with which this inscription opens is, as probably it was intended to be, an enigma; and "Œdipus non Davus" must be he who would solve them. But the substance countenances the idea, that the Gnostics made these stones a sort of countersign to insure mutual hospitality; and it surely quadrates with the seven heads of corporal charity inculcated by the Christian school-men:—

1. *Visito.* To visit men in misery.
2. *Poto.* Give drink to the thirsty.
3. *Cibo.* Give meat to the hungry.
4. *Redimo.* Rescue the captive.
5. *Tego.* Cover the naked.
6. *Colligo.* Dress the wounded.
7. *Condo.* Bury the dead.

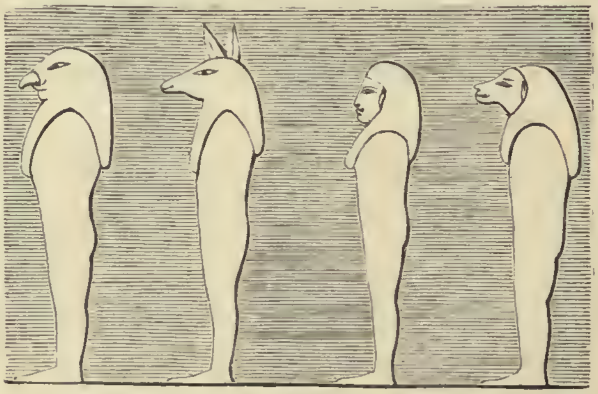
The serpent, Agathodemon, was common upon hundreds of abraxes, as may be seen in Chiflet, Kircher, Spon, Beausobre, Hardouin, Caylus, Montfaucon, Faldner, and other writers. The impression that nine-tenths of them represented invocations to the Devil—as the ΑΒΡΑCΑΞ ΑΔΩΝΑΙ ΔΑΙΜΟΝΩΝ ΔΕΞΙΑΙ ΔΥΝΑΜΕΙΣ ΦΥΛΑΞΑΤΕ ΟΥΑΒΙΑΝ ΠΑΥΛΕΙΝΑΝ ΑΠΟ ΠΑΝΤΟC ΚΑΚΟΙ ΔΑΙΜΟΝΟC of Ulpia Paulina—was very general among the hunters after heresy. But they were really in demand on account of the healing and protecting properties, and other occult virtues ascribed to them in superstitious ages; and the following is one of a very general character. One side of the

amulet below bears the radiated lion's head and serpent, as on the Cyrenean emerald just described: and on the other we find a right line crossed by three curved ones, above which appears ΑΒΡΑϹΑΞ, which in Gnostic notation is equal to three hundred and sixty-five, the annual solar circle. The lower verge has Α Ω, the alpha and omega of the Revelations, with I prefixed: many suppose this I to be the initial of Jesus; but, as the assumption is not admitted by all, the whole remains mystic.



To return to Egypt: The most remarkable, and probably the most morally influential of their religious institutions, was the authority given to the four genii of Amanti or Amunti,—the givers and receivers. Herodotus, Diodorus Siculus, and other ancient historians, represent that the early Egyptians were a people holding truth and virtuous conduct in the highest estimation; and their penal laws mark the high sense of justice entertained by them. This was even carried to the verge of the tomb by mortals, and beyond it by the Amunti. Upon the death of any one, the relations of the defunct had to announce to a certain tribunal the time at which it was desirable to bury him. On this the judges collected a jury, and the court of inquiry was open to all, so that any accusation against the deceased might be urged. Should his career have been a bad one, the rite of sepulture was denied him, which was considered at once a disgrace and a calamity: if, on the contrary, the life of the deceased had

been irreproachable, a panegyric was pronounced upon him, and he was permitted to be entombed with due honour, in order to pass the ordeal of the impartial and inexorable Amunti. No one was exempt from this inquiry, from the kings down to the components of the lowest caste: and even those conquerors or judges who, during life, no one dared to murmur at, when dead were submitted to a rigorous examination. Champollion the Younger saw in Biban-el-Moluk the tomb of a king, in which the sculpture had been defaced from one end to the other, except in those parts where were sculptured the images of the queen, his mother, and of his wife, which had been most religiously respected, as well as the hieroglyphical legends relating to them. This was considered to have been the tomb of a king condemned, by the *post mortem* judgment, as unworthy of the rite of burial. The names of the four genii of the Amunti are,—NETSONOFF or KEBHNSNOF, with the hawk's head, significant of extreme vigilance and promptitude: SMOF or SMAUTF, with the jackal's head, whose chief office appears to have been to superintend the departure of the soul: AMSET, with a human head, the *Tetrarcha* of Dr. Young: and HAPEE, the Cynocephalus, or well-known Anubis. These are their constant symbolic representations:—



The intestines of the dead were dedicated to the Amunti; who, in their offices, strongly remind one of the four beasts, as our translators have so degradingly termed the "living creatures" of the Apocalypse. They may have

possibly alluded to the four elements—Fire, Water, Earth, and Air—which, according to the ancient systems of philosophy, form the constituent parts of all bodies, and into which they are resolved by decomposition.

This leads to another symptom of the "fondly longing after immortality," that distinguished the Egyptians, perhaps more than any other people; a principle not less obvious in the extraordinary efforts which they made to preserve their bodies from decay, than in their huge pyramidal mausolæa, extensive catacombs, and mighty obelisks. Hence also the practice of embalming the dead: an art which they carried so nearly to perfection, that St. Athanasius thought the corpses were as durable as brass. By the tenets of their theology, they were believers in immortality, a principle discernible in their creed of transmigrations for a period of three thousand years; after which doomed revolution, the animus returned to the brainless corpse it had quitted. Hence they strangely conceived that they were retaining the body ready for the soul, as long as the frame could be preserved entire and free from corruption, so that their re-union would be facilitated notwithstanding desiccation. It seems there were several modes of effecting this, of which some were equally operose and expensive; and, though antiseptics and aromatics of many kinds appear to have been employed, the wax used among the embalming ingredients, *moum* in Arabic, has become the general designation of the body embalmed. For the principal operations of the process I must here refer the reader who may be anxious for more particulars on this head, to Mr. Pettigrew's History of Egyptian Mummies, a work published in 1834; where the several steps in the matter are minutely detailed, as well in embalming the human species as their sacred animals. Suffice it here briefly to remark, that, when the mummy was completed, and encased in the cemented layers of cloth now called the cartonage, it was usually placed in a coffin made of sycamore wood, highly decorated by blazonry, representing the face of the defunct, with an abundance of ornaments and attributes. This case was inclosed in another made either of deal, cedar, or sycamore wood; and this generally bore the name of the deceased. Here is a representation of a mummy coffin and its

case, from that of Otaineb, in the British Museum; and we shall presently notice a finer one of Dr. Lee's.

In discussion, some highly-valued classical friends have been inclined to buffet my views of the surprising antiquity of the Egyptian monuments; but their arguments were mostly couched "as in duty bound," and such as astronomers and geologists have from time to time been scourged with. Respecting the remote ages of the Shepherd and Pharaonic kings of Egypt, no reasonable doubt can exist: and yet they were posterior to the original designers of those even still mystic mausolea, the Pyramids of Ghéezeh, which, as old Fuller quaintly observed, "doting with age, have forgotten the names of their founders." Whether they were built before the age of Osirtasen and the sixteenth dynasty, which was about three thousand six hundred years ago, as Sir Gardner Wilkinson thinks, or before the sacred scheme of hieroglyphics was invented, may be left to ingenious conjecture; but from the material being of hewn stone—probably from Lybia—and other inferences based on late inquiries, we are justified in at once pronouncing that they were built long before the Israelitish bondage. For the argument in hand, we need not cling to Manetho

(the learned Egyptian historian) nor Sanconiathon, and still less to Herodotus and his followers in profane history; we may at once refer to the Holy Bible, —merely remarking, as a necessary clue, that all the sounder chronologists of the present day arrive at the conclusion, that the most ancient of the Egyptian monuments are undoubtedly those of Lower Egypt. Here, then, are salient points in the misty past; for these structures shew geologically, that even in those remote times the Delta was fit for agriculture.

It is difficult to enter upon the probable period of these vestiges, without becoming entangled in the deductions of Archbishop Usher; for Champollion and Biot have both arrived at the extraordinary conclusion, that the use of a calendar, founded on astronomical calculations, was known at Thebes so far back as B.C. 3285. From admirable approximations, the epoch of "Menei," or Menes, is placed at about eight hundred years before the visit of Abraham to Egypt; first, by Professor Renwick's astronomical reduction of Herodotus, it was B.C. 2890; by Rosellini's reduction of Syncellus, B.C. 2776; by Champollion Figeac (Fréret's calculation), B.C. 2782; and by Gliddon's reduction of Manetho, 2715. Considering the difficulties which beset the inquirer, these results are comparatively unanimous; and Mr. Gliddon's adoption of B.C. 2750, as a well-sifted average afforded by a long historiographical investigation, is probably close to the truth.

Conjecture has rioted most fantastically as to the object and uses of the Pyramids, but the subject remains a mystery. The name Suphis *(Cheops)* has been found in the great pyramid by Colonel Howard Vyse, which, with some other indications, strengthen the generally received supposition that these edifices were constructed for interment; and some late explorers have assumed credit for pronouncing the mounds on the adjacent ground to be tumuli, and sepulchral remains. But Dr. Lee had long before shewn me the views and plans he had made of these "tombs" nearly forty years ago: and the celebrated Orientalist, Von Hammer-Purgstall, reviewing Colonel Vyse's work in the *Jahrbücher der Literatur*, for July 1843, makes this reclamation: "The greatest merit of the Colonel consists in his having made drawings of all the

tombs which surround the great pyramid, which are added to the plan of its situation at the beginning of the first volume. Yet the first honour of making such remarks and plans does not belong to the Colonel, but to his countryman, Mr. John Fiott *(Lee)*, Travelling Fellow of the University of Cambridge, who communicated a sketch of the town of tombs around the great pyramid to the writer more than a quarter of a century ago; by whom it was made known in the 81st volume of this Journal." *

It is acknowledged that Pharoah was a title common to the Kings of Egypt, and dignified by its great antiquity; being originally *Phrà*, the Sun. From the earliest mention of the one who reigned in Abraham's time, B.C. 1921, to the slaying of the last King Psammikeritis, by Cambyses, a period of fourteen hundred years, a regal succession continued unbroken: and, if Josephus is here to be implicitly relied on, the antiquity of their sovereigns is actually traceable as far back as two thousand three hundred years before our era commenced. Now among a primitive people, the word king may allude to any barbarian who happens to be the elder, the mere head of a clan, or an expert man-slayer—as with the host of sovereigns along the coast of Guinea: but the Pharoahs were incontestibly rich, powerful, and munificent. In the inimitable history of Joseph—Genesis XXXIX. to L.—there is a most accurate description of the splendour and character of a royal court three thousand five hundred and sixty years ago; together with the reception of Joseph's family and kindred, and the largesses bestowed upon them. The circumstance and pathos with which the introduction of Joseph's father into Pharoah's presence is told, together with the death and burial of the aged patriarch, all tend to shew the signal advancement and

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* "Das grösste Verdienst des Obersten besteht wohl in der genauen Aufnahme aller die grossen Pyramiden umgebenden Gräber, welche auf dem Situations plane gleich Anfangs des ersten Bandes aufgezeichnet sind; übrigens gebührt die erste Ehre solcher Bemerkung und Situations zeichnung nicht dem Obersten, sondern seinem Landsmanne, Hrn. John Fiott, *Travelling Fellow of the University of Cambridge*, welcher eine Skizze dieser um der grossen Pyramiden angelegten Gräberstadt dem Prec. vor mehr als einem Viertel Jahrhundert mitgetheilt und dieser im LXXXI. Bande dieser Jahrbücher bekannt gemacht hat."

refinement of the government of Egypt at that period. In accounting for the mental endowments of Moses, ages afterwards, we are told in the Bible, that he was versed in all the wisdom of that country; and the learning of Solomon is similarly mentioned.

Respecting the riches of Egypt, the Sacred writings are confirmed by the statements of all the earliest historians: and imagination is left to guess at the ages requisite for a nation to arrive at such an acme of opulence, science, and civilization. When Cambyses, the son of Cyrus, invaded Egypt about B.C. 525, he caused all the temples of Thebes, which in that great city were very numerous, to be pillaged, burnt, and razed to the ground. We may judge of the richness of those fanes by the valuables saved from the flames, which amounted to the sum of three hundred talents of gold, and two thousand three hundred of silver, amounting together—taking the silver talent at one hundred and ninety-three pounds fifteen shillings, and the gold at sixteen times its weight of silver—to nearly one million and a half sterling. He likewise carried away the famous circle of gold that encompassed the surpassingly magnificent tomb of King Osymandyas, reported to have been three hundred and sixty-five cubits in circumference, and one in thickness *(about one hundred and eighty-two English feet in diameter)*, and on which were represented the motions of the constellations and planets for every day in the year.

From the time of this memorable conquest, the most refined of the Greeks were in the practice of travelling into Egypt for instruction in philosophy; and there is scarcely a sage or lawgiver of any note among the Hellenists, who had not visited the land then taking the highest rank for wisdom and learning, as so strongly instanced in Homer, Lycurgus, Solon, Pythagoras, and Plato; while Herodotus declared that it claimed their admiration beyond all other countries. This they have ingenuously acknowledged; but we can now trace home to them that they also borrowed largely from the architecture, arts, and elegancies of life of the Mizraimites. The Romans also followed on the same side. Tacitus (Ann. ii. ann. 772)

informs us, how "Germanicus went into Egypt to search for antiquities; that he went to see the great remains of old Thebes, where there were still extant, in some remaining structures, Egyptian *letters*, indicating its former wealth: and that when one of the elder priests was commanded to interpret them from their own language, he declared they told him of there having once been seven hundred thousand men in that country, of an age fit for war; and that with such an army their King Rameses conquered Lybia, Ethiopia, Media, Persia, Bactriana, and Scythia, and those countries which the Syrians, Armenians, and Cappadocians inhabit. He read also the tributes that were imposed on the nations; the weight of gold and silver; the number of arms and horses; the quantity of ivory and sweet aromatics for the temples; with the quantity of corn, and other necessaries, which every nation furnished; and this not inferior to what the Parthians or the Romans required from the vassals in their own time."

The *letters* here alluded to by Tacitus, constitute the principal value of Mizraimitic vestigia; and therefore they merit a moment of our time. It is a natural inference, that mankind in their primeval state aimed at fixing the fleeting expressions of speech, and still more circumstantial events, by permanent realized images, as well as they could form and describe relations and actions. Hence picture-writing among the Egyptians; an art by which their imperishable records even now fill us with astonishment at the nature of the institutions, the extent of learning, and the perfection of arts, attained by them at so early a period. The hieroglyphical language is of a triple character: it is chiefly phonetical or alphabetical; next figurative or typical; and thirdly symbolical, or meaning something more than expressed,—which last division, the most difficult to be ascertained, forms fortunately the least portion of the language. Unless this be admitted, the neophyte, instead of systematic symbolic metaphors, will only perceive incongruous representations of human bodies, beasts, birds, reptiles, implements, and other characteristic objects: but so far had refinement in language advanced, that every object had a proper name. And that a latent meaning was concealed therein, has for

many ages been conceded, but it was reserved for the nineteenth century to seize the guiding clue: and he who wishes to see how the learned managed these matters a couple of centuries ago, need only look at the risible absurdities of the painstaking Kircher. On the other hand, Diodorus Siculus is among the earliest who gave instruction on this point, assuring us that the hawk was typical of velocity; the crocodile of everything that was evil; the human eye was the symbol of watchfulness, justice, and Divine Providence:—an open right-hand, with the fingers extended, signifies the supply of human life, while the left-hand closed denotes toilsome care. Such remarks shew that attention was drawn to the Land of Mizraim; though, from further observations, Diodorus evidently required an ulterior drilling.

There are also three kinds of writing found upon the papyri frequently met with in mummies: these are the hieroglyphic, the hieratic, and the enchorial. Of these, the two first-named are exclusively confined to sacred subjects, and the third is the vulgar character of the Valley of the Nile. Now full two thousand two hundred and sixty years ago, the father of history, good old Herodotus, intimated that the theologic theorems expressive of the abstruse nature of the invisible Spirit, were written in the holy and secret letters; that the Egyptians had two sorts of writing, one called the sacred, the other the demotic or civil; and that common letters, and reckoning with counters,* were by the elementary or alphabetic method, written from the right hand to the left, a circumstance not predicable of sculptures or pictures. It is now held, that the enchorial was only a more cursive and rapid mode of writing the hieratic character; and that the hieratic was only a descent from the hieroglyphic; the which may therefore be regarded as the fullest type of the language itself. From the radiant light they throw upon each other, the advanced progress which the human mind had made at that remote period is unfolded most unequivocally; the indications of thought are exhibited with designed

* Among Dr. Lee's smaller Egyptian relics, is an arithmetical tablet of ivory—two inches and three-quarters long by three-eighths of an inch square—marked with small discs in groups.

arrangement and clearness of expression; and among the Egyptian treasures of the British Museum, is a papyrus with a poem in the hieratic character, which commemorates the exploits of Rameses the Third, B. C. *circ.* one thousand five hundred and fifty years, or three thousand four hundred years ago! Unhappily, the same pages that bear evidence of man's power and glory, yield also astonishing instances of his cruelty and degradation: for example, the miserable Kushites have been persecuted as a perverse race, and the enslaved of all nations.

As Egypt appeared to be the only remaining one of the ancient kingdoms which has been handed down to posterity with landmarks too distinctly defined for doubt, and with monuments too enduring for decay, it seemed as if the country of the Pharoahs had been preserved for inscrutable purposes; whilst the early and co-eval states were considered to have passed away for ever. The enterprise and research of the present day, however, with the consequent indomitable energy of their conjunction, have opened a wider field for contemplative admiration, by extending our knowledge in Chaldea, Babylonia, and Assyria; and, though Egypt still takes the lead in antiquity, the collateral information respecting the existence of other mighty kingdoms of which the name only remained, is of wonderful interest. The exertions of Mr. Layard at Nineveh need hardly be instanced, since so large a portion of the fruits of his excavations are open to public scrutiny in the British Museum; but I may mention, what I trust will be no news when the present page is ushered forth, that Major Rawlinson * has recently informed me that matters of still greater interest are at hand. He shewed me some truly important letters from his friend Mr. Layard, with whom he had laboured in Babylonia, which labours will be fraught with results of the deepest consequence to history, and

* I cannot allude to this intelligent officer without recording the singular gratification which I received some years ago, by his extraordinary exertions in first taking copies of the rock inscriptions of Bizitûn *(Bagistan of Diodorus)*, in Persia; and afterwards breaking through the supposed impenetrable mist of the arrow-headed, or cuneatic, characters which covered the faces of the cliffs. From these efforts we have obtained the life of Darius, written by himself, as it were; and this wonderful record gives another of the many instances, in which an accession of accurate knowledge displays the general integrity of Herodotus, as the historian of the early ages.

even ethnology; at all events it is probable that we shall soon have a better account of what the religion, jurisprudence, and philosophy of the Assyrians were, thirteen centuries before the Christian era, than we have of Greece or Rome during any part of their history. In excavating underneath the great pyramid of Nimrod, both the tomb of Sardanapalus and a statue of him were found in a vaulted chamber, which chamber was entirely lined with inscriptions, probably containing records of his reign. Many other slabs and cylinders had been disinterred, which are also covered with seemingly historical writings; but the most important of all was opening the "House of Records," where Mr. Layard had penetrated into a chamber containing an enormous number of terra-cotta tablets, piled up from the floor to the ceiling, and apparently representing the archives of the empire during a long historical succession. The Assyrian mode of writing, presents various knotty difficulties as yet; but there are Rawlinson, Renouard, Hincks, and other able philologists in the field. This inscriptive character is said to differ from that of the Hebrew and other Semitic languages; but it agrees with the Egyptian in being in a measure ideographic. Some words consist entirely of ideographs; others are written partly phonetically, but have ideographs united with the phonetic portion. When all the turns shall have been taken out of the coil, among other advantageous results that must follow, there will finally be the additional and strong lights thrown upon the collateral story of Egypt.

In further insisting upon the vast antiquity and marvellous civilization of the Egyptians, I must again refer, even at the risk of repetition, to those recent happy discoveries which have converted into unerring fingers of history, the stupendous monuments which so long merely excited wonderment. From the talent now applied, the public career of that remarkable people is directly pointed out by sculptured wars, victories, triumphs, and tributes; division of labour in official employment is seen in the several offices, occupations, mechanical contrivances, and the various weights and measures; while the pursuits and refinements of private life, even to their very gymnastics, feasts, and amusements, have been brought to light in the actual pictures which

they themselves had painted. Niebuhr, indeed, has laboured to undermine the ingenuous confession of Herodotus, which attributes to Egyptian colonists the first introduction of the arts of civilized life into Greece; and he paradoxically seems to assume that the Pharaonic race were "no great shakes." But Niebuhr could have hardly studied his subject sufficiently: for of the height and perfection to which they must have attained in the mechanical powers—even without the application of steam—we have abundant proof in the wonderful works they have left behind; works placing their great command of ingenuity, skill, and construction beyond dispute. Herodotus was right: and specimens of the so-called Doric architecture, models of vases usually denominated Etruscan, and letter-characters to transmit history—all of transcendant date in the Valley of the Nile—give stubborn and unequivocal proofs that the Greeks, to modify an expression of Bentley's, have been "riding to us on the back of the Egyptians."

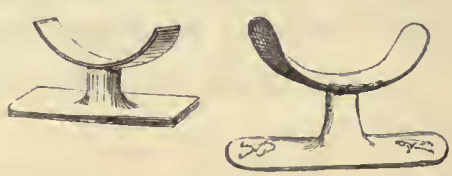
Had Niebuhr properly followed up his inquiry, and treated the matter before him with less prejudice, he must soon have acknowledged the claim of the Mizraimites to inventions and discoveries in almost every branch of art or science, to be eminently just: and this would have proved how very little the Greeks, Romans, and Moderns, can boast of prime originality. Though they seem to have been ignorant of iron, the Egyptians made a profuse use of gold, silver, and brass; and castings of the latter must have been carried to a high degree of perfection, as evinced in their ornamented war-chariots, swords, quivers, knives, axes, and adzes. In articles of attire they were both laborious and elegant, although the figures depicted are conventionally formal. The textile fabric of which their dress consists is often arranged with singular care: among other features of fashion, we observe gloves; and there are approaches to the high-pointed shoes of the middle ages, with party-coloured twisted laces. As to their weavers, they seem to have distanced in delicacy all the looms of India; for the ladies often appear in dresses so transparent as to have obtained the designation of "woven air:" and the light fine texture of the Egyptian muslins is alluded to in the

description of Pharaoh's daughter in the xlvth Psalm. That the female toilet was considered an important affair, is abundantly testified; and the supply of necklaces, rings, and jewels was not at all niggardly. The hair was a matter of serious moment to both sexes, and specimens of the head-dresses still preserved in our collections, attest the care and proficiency of the archaic friseurs. In some of the heads of people of distinction, the hair descends in a lappet on each shoulder, and at the back assumes a singular rounded form, marked with a number of radii, all converging towards a centre at the nape of the neck, where they unite: of this good examples may be seen in Belzoni's Atlas, Rosellini's plates, &c. In the subjoined representations, the first is a head-dress of courtiers and fan-bearers of state; the central one is the royal Osirian *dulbant;* and the third is the high round cap called *Teshr*, seen to be royal by the sacred asp in its front—

What with natural tresses well oiled and plaited and curled and matted, and wigs of a density unknown in these degenerate days, though the Mizraimitish ladies may have thereby guarded themselves against a *colpo di sole*, they at the same time protected wholesale colonies of the descendants of the third plague, a plague which is not recorded to have been stayed, and which even now exists "throughout the land of Egypt." Mr. Joseph Bonomi found the same characteristic head-dress still in use among the women of the

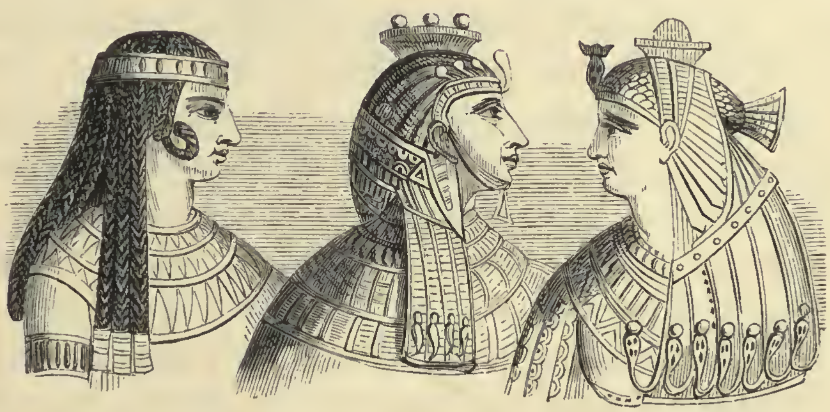
upper country; and he thus represents, *adversa,* the ancient Egyptian and the modern Nubian—

moreover, as the elaborate character of the tresses in both demand the same care to avoid derangement, the same necessity existed for similar means of supporting the head during the hours of rest. Annexed is the figure of an ancient wooden pillow, or head-stool, of which there are two or three at Hartwell, and by its side is the modern Nubian one. The use of the contrivance is obvious; the neck of the sleeping beauty rests on this support, which, passing below the hanging locks, allows them to fall unpressed and uninjured. It is called *ulz,* and is still found in Abyssinia and other parts of Africa; nor is it altogether unlike the bamboo substitute for a pillow now used in China.



From such peculiarities, it was not easy to demonstrate how the fashionables of Egypt became the *arbitri elegantiarum* of the tasteful Greeks; for albeit the Mizraimitish paintings are rich in colour, and tolerably faithful in outline, we search in vain for that beauty of form, grace in drapery, and sublimity of expression, which immortalize Hellenic talent. It is certain, however, that the Greeks did not travel from Memphis to Meroe and find that all was barren; for recent discoveries have shewn that they gleaned a tolerable harvest of useful hints in the industrial arts, many of which they afterwards brought to the highest perfection. So with the head-dress of the fair sex: for some time Europe had indulged in the notion, that the Egyptian ladies sported only the sort of sphynx-fashioned front, with ringlets and

flaps over the shoulders, as seen in the early prints; but later investigations of the monuments and paintings of Egypt have corrected this notion, and prove the variety and elegance of their coiffure. Of these, till recently, we had mere representations, but palpable evidence of the skill employed is now to be found in various cabinets. Among the Egyptian treasures in the British Museum, is an actual wig, perhaps once worn at some of Pharaoh's conversazioni; which, from its size, glossiness, and high antiquity, is truly interesting. From an examination of the statues of Isis, Count Caylus thinks that the women did not only retain all their hair, which was often cut square on the neck, but added thereon flocks of wool, one row above the other. In the following wood-cut a specimen is given of the braided tresses, the net-cap, and crescent of, perhaps, the age of Amenoph the Third (B.C. 1,400).



In poring over these knotty subjects, I could not but be struck with their resemblance in taste to some of those of Mexico; and will therefore give two heads with the tiara and drops appended thereunto, which I place by the side of a female of the Tlascaltecas, copied from Lord Kingsborough's great work on the Antiquities of Mexico; and it is curious that Dr. Lee has two fine little applicable examples in stone resembling the latter in feature, which were brought to England by the Duke of Northumberland. In the representation here submitted, the heads *jugata* are Egyptian, and the other Mexican—

EGYPTIAN.

MEXICAN.

There are some very curious specimens of head-dress among the Hartwell sculptured stelæ; and some of no small moment to the antiquary. Thus the female choristers who attended Pharoah's daughter, on the occasion of her marriage with Solomon, have been clearly identified by comparing the Scriptural record with the Egyptian monuments. The title of the forty-fifth Psalm —*To the chief musician upon Shoshannim*—had long and sorely baffled the commentators, Jewish as well as Christian. The word Shoshannim signifies lilies, which seemed to have nothing to do with the subject-matter of the Psalmist, whose meaning was freely misinterpreted. But this epithalamium, or hymeneal ode, was intended to be sung by the female attendants of the Egyptian princess; and they are called the lilies, in direct allusion to the lotus-lily being a conspicuous ornament of their head-dress. Shoshannim, then, instead of being a prophetic rhapsody, or the name of an unknown air, as asserted, is a poetic allusion at once to the country, the beauty, and the attire of the songstresses. The lotus has given rise to much controversy among the learned, like the pale violet of Horace, and the Pæstum rose, and the hyacinth of the Greeks and Latins; but the mode of wearing this lily will be seen in Rosellini's plates; as well as in Sir Gardiner Wilkinson's "Manners and Customs of the Ancient Egyptians," volume the second, pages 191, 291, 299, and 312. Vestiges of the fashion still exist in the Levant, in the fez, or scarlet-cloth cap, being often adorned with a flower pendant on the forehead.

Besides what has been advanced on the cultivation of astronomy and geometry, the Egyptians must have made a great advance in practical mechanics, or they could never have raised their columns and obelisks. They knew the principles and practised the art of constructing the arch, which, although used in Etruria with many other Egyptian customs, were not geometrically understood by the architects of early Greece. The papyri prove that they were masters of arithmetical book-keeping, three thousand years before the Italians had thought of such a science. The manufacture of linen, paper, ropes of leather thongs, glass, and porcelain, were ably executed; in agriculture they employed the plough, the hand-plough, the harrow, and the sickle; and they also worked wine-presses in primæval times. It is fortunate that they dabbled largely in the fine arts, but for which, many of the assertions here made could not have been sustained.

The practice of portrait-sculpture has been carried back to two thousand years B.C., and its origin is even then untraceable: this assertion is based on a fact insisted on by Champollion, namely, that the faces of the Pharaohs of Egypt, graven on temples, are all *bonâ fide* likenesses of the individuals represented. The sculptures on public monuments were mostly coloured: yet the tints given to each symbol were not arbitrary on the part of the artist, but applied agreeably to a systematic regulation,—as, the heavens azure, the earth and men of Egypt red, the women yellow, and the Asiatics and Negroes proper, in the nearest approach to their true complexions. Portrait-painting seems also to have been practised immemorially, as indeed would naturally be expected if the above position be granted. Upon a mummy in the British Museum, which was sent to England by Consul-General Salt, is a portrait which has excited much attention: it is painted on a plank of cedar, and it is found that the colours are all vegetable, being fixed by a strong gluten,—the several tints are brilliant, and the light upon the features artistically managed. As to the knowledge and skill of the Egyptians in fresco-painting, they must be deemed most extraordinary, whether as referring to the multiplicity of their compositions, or the imperishable nature of their

pigments. Belzoni told me of his astonishment, amounting to awe, at the freshness and vivid hues of the representations in the tombs of the kings which he opened at Thebes: and Mr. Henry Beechey, my former shipmate, who was with Belzoni, on seeing the galleries at Biban al Moluk, said,—"One would think that Titian, Giorgione, and Tintoretto had here acquired all that vigour and magic of effect which distinguishes them so remarkably from all other painters in point of arrangement, and principally in the happy distribution of their darks."

It is not the least extraordinary fact connected with our subject, that, while jewels, gold necklaces, ivory ornaments, ear-rings, seals, glass beads, spangles, rings, and almost all other articles of *bijouterie* have been exhumed in abundance, no coined money was ever found with the mummies of archaic Egypt; nor has any been discovered there of a date anterior to the reign of Alexander. It seems that their commerce was conducted by exchange, and we can trace in their pictures the manner of barter: rings of gold or silver having been used in the larger trading transactions, and nuts in the smaller. Now it is truly singular that, on the conquest of Mexico, the Spaniards found the precious metals profusely employed for domestic purposes, but there was no coined money; which, combined with many other striking analogous customs, opens a curious field for both antiquaries and ethnologists.

The art of beating out gold leaf must have been well known, for specimens now lodged in our cabinets unequivocally evince that gilding was largely practised by the Egyptians. Among Dr. Lee's relics is the hand of a female, the nails of which are gilt; * and it is not unusual to find mummies with large patches of gold leaf, on various parts, from the crown of the head to the feet. Signor Passalacqua is of opinion, that all the mummies found to have been gilt on the flesh are Greeks, who either in

* In a mummy which I was invited to see opened at Lord Londesborough's last summer (1850), and which proved to be the remains of a priestess of Isis, the finger-ends were discovered to be tipped with silver, fitted to their shape over the nails.

the time of the Pharaohs or Lagides were living in Egypt: an ethnological examination is necessary to decide such a question, and also to establish whether most mummies do not afford indications of the time in which the individual lived. In one of those opened by Passalacqua in 1829, one of the eyes proved to be false, being very capitally made of glass.

Through the zealous offices of Consul-General Salt, the Basha of Egypt had promised me a hearty reception in his dominions: but when I repaired thither in the spring of the year 1822, the bellicose state of the Levant, and the presence of the Turkish, Egyptian, Algerine, Tunisian, and Tripoline squadrons in the harbour, compelled me to remain in Alexandria for the protection of the flag. This was a source of considerable regret to me, since I had obtained the permission of the Admiralty, and hoped, with the aid of Messrs. Salt, Briggs, Lee, and Thurburn, to give a satisfactory settlement to several contested points, while the secondary details of my survey were being filled in; an office for which my means, superior instruments, and practical experience, pretty well qualified me. Among other matters, his late Royal Highness the Duke of Sussex—who was greatly interested in Belzoni's operations—drew my attention to the necessity of an absolutely accurate measurement of the angle of inclination of the newly discovered passage into the pyramid of Cephrenes, usually termed the second pyramid of Gheezah; thereby to ascertain whether any philosophical relation could be drawn from it, in conjunction with the monstrous edifice being erected exactly to the cardinal points of the compass, with the entrance in the true meridian. Now there are few points of Egyptian story more generally conceded, than the vast antiquity of the Mizraimitish scientific observations and computations, a demonstration of which exists in their early sothic and civil periods, and their exact establishment of the year and its parts. But though astronomy had unquestionably advanced among them, and was even connected with the ceremonials of their religion, it is highly improbable that a structure should have been raised merely for an observatory, which is four hundred and fifty-six feet high and six hundred and ninety

square at the base, which contains ninety millions of cubic feet of masonry in its construction, and the materials of which may weigh six or seven millions of tons: let alone the building so many of these costly piles so near each other. The dogma that they were the early gnomons from which all the knowledge the Egyptians had of the solar theory was derived, is risibly absurd, seeing that the shadow would fall within the base the greater part of the day, and also for a great part of the year

Examinations of this kind, however, were not fated for me; succumbing therefore to circumstances over which—in usual parlance—I had no control, the survey of the coast of Egypt was pursued, with that of as much of the interior as could be conveniently probed. Mehemet Ali, the Pharaoh of the nineteenth century, expressed himself much pleased with our instruments and operations, and numerous were the topics which he from time to time discussed with me. The same train of events which prevented my going far from the combined shipping, made it also politic for his Highness to remain at the port; thus were we both detained at Alexandria. Our main medium of communication was his Admiral, Ishmael *Gibraltar*, an officer of most gentlemanly address and amiable disposition, who spoke English with fluency; and who, poor fellow, was killed in action with the Greeks in 1824. From my having been long acquainted with his son Zadig, the Basha's accredited agent at Malta, Ishmael was zealously attentive to all our wishes.

In the potent Mehemet Ali, I found a most useful coadjutor; for my situation, with a single ship among so heterogeneous a fleet, might have proved a troublesome one, had not such a decided authority been on the spot. The first case of complaint was fortunately of so grossly insulting a nature as to admit of no misunderstanding; and therefore the prompt proceedings which followed were productive of excellent results. It happened that an English merchantman had sent her launch nearly three miles for a load of water, and had just returned with it alongside, when a Turkish frigate sent a boat and took it from her. On this being reported to me, I forth-

with despatched my first Lieutenant, the present Captain Oake, with a violent remonstrance to the Basha. What ensued was consonant with the identical principles of conduct, and rules of action, which have prevailed so immemorially in these regions; so that the vicissitudes of Pharoah's chief butler and baker were somewhat paralleled. The poor Captain of the frigate, who was on shore at the time, and therefore unaware of the action, was superseded in his command; and the unlucky mischief-maker who despatched the offending boat, was most summarily sentenced to be bastinadoed before me. At my interference, however, he escaped the corporal punishment; but was forthwith degraded to serve before the mast. Thus, in Haman-like style, he who might be strutting the deck of a superb man-of-war as her commander at one hour, might be in her head wringing swabs in the next. And the absolute sovereign who could command all this had himself originally been a servant, and a retailer of tobacco; unable, it is said, to sign his name until he had arrived at the age of thirty!

The government of Mehemet Ali may have been too extravagantly praised by panegyrists, and wonder-struck tourists; but it was immeasurably more rational, humane, and beneficial, than that of the odious Mamluks, from which—*more suo*—he had delivered Egypt. Though far from being a thorough-paced predestinarian, as evinced by his precautions against plague, he yet considered that he was specially destined to be great; and he expressed himself gratified by the coincidence of having been born in the same year with Napoleon and Wellington. Unlike many of fortune's favourites, he was given to recal his early career: "I was born in a village of Albania," said he, in his usual quick and lively manner of speaking, "and my father had ten sons beside myself, who are all dead: but while living they never contradicted me. Although I left my native mountains before I had attained to manhood, the principal men of the town never undertook any business of the district without previously inquiring what was my pleasure. This gave me self-confidence. I came to this country an obscure adventurer; while I was yet a *binbashee*, it happened one day that the keeper of the

tents had to deliver to each binbashee a tent. They were all my seniors, and therefore naturally pretended to a preference over me; but the tent-keeper said—'Stand ye all by; this lad, Mehemet Ali, shall be served first:' I was served first; and I advanced step by step, as it pleased God to ordain, and here I am!" To this he might have truly added—"one of the greatest men of modern times, and certainly the greatest of Orientals."

Mehemet Ali effected extensive reformation over the whole moral and physical face of Egypt, with keen sagacity and steady purpose; while, superior to the bitter prejudices and debasing tendencies of his creed, he evinced in himself resources equal to the pressure of such eventful times. He was resolute without fanaticism; and, though despotic in the strict sense of the word, he acted consistently with the forms and regulations which he had himself established. Summary and terrible in emergencies, his measures yet manifested more of plan and coolness than of vengeance; he administered impartial justice to all his subjects, with a practical tolerance of race and religion. He founded regular judicial courts, established public hospitals, raised an efficient police, redressed numerous grievances, and suppressed torture. His Highness not only broke through the ignorant prepossessions which prevailed among the Moslems against the arts and learning of Europe, but encouraged instruction, manufactures, and productive labour to an astonishing extent; inviting Christian artizans to settle in his dominions, and sending a number of picked Egyptian youths to England, France, and Italy, to be instructed in science as well as art. Moreover he erected and endowed naval, military, and polytechnic schools; with colleges of physic, law, and belles lettres; means by which he raised the population of Alexandria from about seven thousand to nearly seventy thousand. By the introduction of improved implements of agriculture, he increased the productions of Egypt beyond what could have been reasonably expected, among a people so wedded to the customs of their ancestors; and he converted whole tribes of nomadic and pilfering Bedoweens, into useful cultivators of the land. He was also a wholesale farmer himself; and here it was that his bump of acquisitiveness cropped out

through the general soundness of his polity. In 1822, he planted a large district in Upper Egypt with the gossypium, and so immediately was its due cultivation followed with productive effect, that in the very next year he shipped off sixty thousand bags of cotton, of two hundred and twenty pounds each, from his own stores. On this occasion, he was exceedingly particular in inquiring of me the result of the culture in Malta and Goza; and when I told him that its value as a staple consisted in making it into yarn, as an employment for the people, he said he was not ready for that yet, but that he would soon supply the market with raw material.

In carrying on his extensive operations, Mehemet had recourse to numbering the people, a measure to which the whole population—Turks, Copts, Moors, and Arabs—entertain the old and rooted antipathy: and though a deplorable loss of life was incurred by exposure and incompetency in cutting his great canal, the loudest complaint of the suffering Fellahs was against being "told off like sheep." This canal was a grand undertaking, though the effect of the means employed tarnished the brilliancy of its conception. The trading navigation from the mouth of the Nile to Alexandria was always attended with considerable difficulty, and not a little danger to the deep-laden vessels of the river, especially when the on-shore winds raised breakers on the bar of the Rosetta Bogaz. To avoid this obstacle the Basha, at the suggestion of my friend Mr. Briggs, resolved to cut this canal from Alexandria to a village on the banks of the Nile, called Atfieh; but as it was necessary that such a work should be accomplished in one season—since the inundation would otherwise mar the proceeding—celerity was urgently demanded. For this purpose his Highness appointed Ismaël Basha director of the works, with various subordinate officers; at the same time issuing orders to the several sheikhs of the adjacent provinces to furnish each a quota of labourers, and to encamp them along the site of the intended cutting. By these means upwards of two hundred and fifty thousand men, women, and boys were simultaneously employed as "navvies" upon the undertaking, so that the main excavation was made in about seven weeks; and in less than seven months a canal was completed of

forty-eight miles in length, from ninety to one hundred and twenty feet in breadth, and from seven to fourteen feet in depth. I own that when I saw this great commercial artery, with its numerous kandjahs and passage-boats, together with the extensive Mahmoudieh granary at its entrance, containing five hundred thousand quarters of corn and pulse—the glories of ancient Egypt flitted before me, and Joseph's "gathering" seemed to be realised in the busy scene. But the iron energy of the exertion, and the squalor of the working Fellahs, broke the meditation.

This uneasy recollection leads to the contra side of the Basha's character; and, though the habits of Islamism place his morals out of the pale of Christian estimation, his polity must be submitted to that ordeal, even under the acknowledged and peculiar difficulties of the position which he usurped. In his home department, the grasping and monopolizing spirit of Mehemet Ali, who seized the lion's share of the produce, and allowed the growers such prices only as he thought fit, operated ruinously upon the general trade. Yet through this, he created a stimulus by which all Egypt was upheaving to her former consideration, having only one intelligent despot to deal with, instead of the five hundred profligate brutes who lately governed her: so decidedly did he re-introduce commerce, that even his monopolies cannot prevent the whole community from experiencing the beneficial energy of his sway. The most impolitic international act of his life was the expedition to Greece; yet that enterprize was forced upon him by the Sultan, towards whom he maintained a sort of "wide awake" allegiance: the alternative was war with the Porte, and he chose the safer side. Hence arose expenses far too prodigious for a state under regeneration; costs which led him to screw his subjects by violent expedients, grinding taxation, and oppressive conscription. Unluckily, ambition presented still wider views: in an evil hour he undertook to build line-of-battle ships of the greatest tonnage in the world at Alexandria—a place destitute of timber, metals, anchors, cables, ordnance, and indeed all naval munitions and requirements. For instance, of his six large three-deckers, the Sultan Mahmoud was of one hundred and seventy-eight feet keel, two hundred and ten feet in length

on the lower deck, sixty feet six inches in breadth, and twenty-five feet five inches in depth of hold; she mounted one hundred and thirty guns, was of three thousand two hundred and fifty tons burthen, and had a complement of one thousand three hundred men!

Such changes wrought in a few years in the condition of a country which, for previous ages, was comparatively unknown among the nations of the earth, or only synonymous with torpor, decay, and misrule, cannot but prove the active energy of Mehemet Ali. At the time the Sultan Mahmoud was commissioned, the Basha had an army of thirteen thousand cavalry, one hundred and twelve thousand infantry, twenty-two thousand artillery, and seven thousand irregulars; and there were upwards of twenty thousand seamen and marines. Although he was in his own person Lord High Admiral and Commander-in-Chief, to save himself the trouble of details he appointed a Minister of War and Board of General and Superior Officers, which was vested with the power of directing all matters relative to the interior economy of the army and navy. These extraordinary exertions were accompanied with a grievous expense; the revenue of Egypt when I was there amounted to about two hundred and thirty thousand purses, but in 1839 had been forced to more than five hundred thousand, besides the so-called donatives; the purse consisting of five hundred piastres, answering, consequently, to 5*l.* 4*s.* or thereabouts, English money.

To descend, however, from the public career of Mehemet Ali to a smaller sphere of action, I may be permitted to record that he manifested an interest in the remains of antiquity around; and himself pressed my examining the Baths of Cleopatra, and the ancient catacombs * between the harbour and Lake Mareotis: he was also the means of my procuring some good specimens of the coinage of the Ptolemies, and a few choice Egyptian relics. He had, in excavating the ruins of Canopus to procure materials for his great canal, found

* On my afterwards telling him that I had explored these catacombs till I was almost exhausted, "Then," said he, "it will require you to air yourself on the column *(Pompey's pillar)* after that!" Another spice of his good humour was his sending me a female mummy, with a message, that, as my wife was not on board, he had sent an Egyptian lady to preside in my cabin.

some curious articles of ancient workmanship; among others a thin plate of pure gold, with a punched inscription—*opus mallei*—shewing that Ptolemy Evergetes had dedicated a temple there. This he prized greatly, saying to Mr. Salt, "You are not to have it: I shall send it to my good old friend, Sir Sidney Smith." That gallant Admiral had an excellent fac-simile of it made in Paris, with gilded pasteboard; and the copy which he presented me with, I gave to the Basha.

Apropos of Canopus. I was one day passing along a narrow street in Alexandria, leading to the port, at the bottom of which a boat was waiting for me, when I perceived some men repairing a baker's oven, which, as is usual in the Levant, was open to the street. Seeing a flat slab of basalt placed against the wall, and being curious about a slice of so obdurate a stone, I made inquiry and found that it had just been brought from the ruins of Canopus, to be placed at the bottom of the oven. While talking as well as I could to these worthies, one of them turned the stone round, when, to my surprise, I saw on it a sculptured Thoth or Hermes, in early workmanship: he was naked except a singular scarf over the shoulder, and he held the mystic caduceus in his right hand, with a well-formed Chelys lyre in his left, whilst his carefully dressed hair was protected by the broad-brimmed petasus.* A trifle soon arranged matters, and, my boat's crew being at hand, the prize was quickly on board my ship, the Adventure. As the late Duke of Buckingham was interested in Egyptian antiquities, and I was moreover troubling him with some African plants to tend, I sent the Thoth home to him as a present, under the care of my good friend the late Sir Charles M. Schomberg. It was received in England with pleasure, and installed with honour; but its wanderings were not over, being among the sacrifices at the recent unhappy sale of the princely collection at Stowe.

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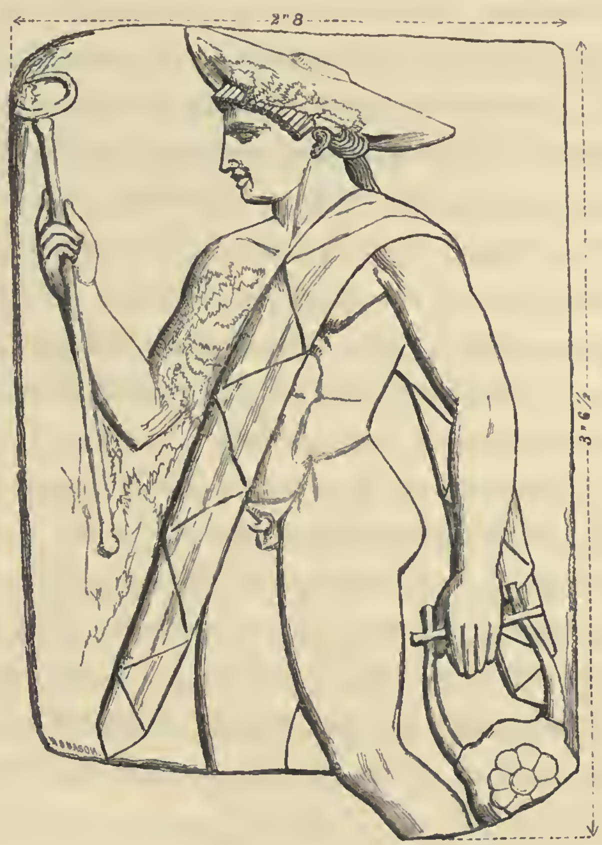
* It cannot be doubted where the Greeks borrowed the lyre from, and even some of their music. Herodotus thought a particular song he heard in Egypt resembled a Greek one by Linus; but the perplexity he was under to account for it would have vanished, had he reversed the conditions.

On seeing it in the Catalogue of Antique Sculpture, No. 104, I was thinking of competing for its re-possession, but that I understood the officials of the British Museum were determined to secure it. Now as that noble institution could not but prove a stable resting-place for the precious relic, there was no opposition offered, and it fell to the trustees for only eleven guineas. Since it has been in their possession, the classic artist Bonomi has made a drawing and measurement of it, from which this representation is engraven:—



Mehemet Ali was highly amused on my telling him that old Ali Basha, Vizier of Epirus, the noted ferocious "Albanian Leopard," had given me

permission to examine the ruins of Nicopolis, with the proviso that he must see the produce of my excavations. "Ah," said his Highness, playing with his feet as he squatted on the ottoman, "Ali would have proved *troppo furbo* for you." On my relating—at his own asking, by-the-way—our operations among the ruins of Leptis Magna, of my method of embarking the weighty columns obtained there for the King of England, and of the present which I brought out from our Government to the Basha of Tripoli in consequence, he said that he also had several places which he would like me to examine, *when the Greeks were quieted.*

Among other matters, he wished me to undertake the embarcation of the fine obelisk at Alexandria, popularly known under the designation of Cleopatra's Needle; * at the same time offering every assistance which it was in his power to afford. This, however, we had neither time nor authority to compass, though I talked the matter over with him and his officers, in case of receiving specific orders from home. Two methods struck me: one was by building a pier from the immediate vicinity of the obelisk, into the little harbour, to the end of which a ship of the north-country cat-build could be brought, with her stern-frame cut out; the obelisk then to be so moved on rollers, that half of it should be in the vessel before the weight was felt. The other scheme was to excavate the ground on which it is lying, so as to form a dry dock beneath it, building a lump or lighter in the cavity into which the monolith could be lowered, and then cutting through the narrow neck of land into the harbour; so that on the admission of water it might be floated out. In either of these cases, of course the vessel would be properly dunnaged with bales of cotton, and well-made fascines, so that the needle in mid-ships would lie easy, and press upon every timber alike. All this was detailed to the

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* Such is the absurd name of a monolith which was cut at the granite quarries of Syene, seven hundred and fifty miles from its present site, three thousand five hundred and seventy years ago, and consequently upwards of one thousand six hundred years before Cleopatra's great-grandmother was born. It is sixty-eight feet five inches long, seven feet three inches wide at the base, and five feet in width under the apex: and it must weigh about two hundred and thirty tons.

Admiralty; and on arriving in England, I had a special conference on the subject with the Right Hon. J. C. Herries, at the Treasury.

From what then transpired, I was in hopes that everything was settled, especially as I recommended an officer, Lieutenant Symonds, R.N.—the present Sir William Symonds, late Surveyor of the Navy—for the mission; who being then the harbour-master of Malta, was comparatively on the spot. However, a few mornings afterwards, a scion of interest called on me, saying that he was appointed to bring the needle from Egypt, and that he was directed to consult me about it: "You have given in the name of a lieutenant at Malta," added he, "and I shall have no objection to take him with me,—but are you sure that he is not a mere pen-and-ink man?" I merely repelled this by observing, that before proposing the officer to Government I was satisfied as to his ability, he being an experienced seaman and a man of general resources; but that I greatly doubted whether he would go second to any one of whose talent for the task he was unacquainted. The appointee, I found, had never witnessed any great mechanical effort, and his mind seemed a *tabula rasa* in engineering; yet I offered every service in my power, wishing that, whoever went, the service should be creditably executed. But * * * * the needle is in Egypt still!

Meantime the Basha had presented a similar obelisk to the French nation; and, though it was upwards of five hundred miles above Alexandria, that energetic Government lost no time in getting it over, and erecting it in Paris. Remonstrating on this point with a minister of state in the then administration, and mentioning my chagrin that Cleopatra's Needle had not already been erected in Waterloo Place, he captiously demanded whether an Egyptian obelisk in London would not be an anomaly? To this I answered, that the Needle well placed, with Nelson and the Nile, Abercrombie and Alexandria, inscribed on its base, would at least be as appropriate a reminder for London *

* Sonnini de Manoncourt, in his *Voyage dans la Haute et Basse Egypte*, predicted that Pompey's Pillar would only be recognized in after ages by the name of the Monument of the French; and for this reason, that the names

as anything that could be done for the Parisians. On telling him what I thought would be the cost of bringing it over, and I gave a reasonably small figure, he broke off with—" I dare say Chantrey would cut us one in Aberdeenshire for less money!"

The magnificent column generally called Pompey's Pillar was a severe puzzle, since no attention can be given to the vague surmises which have been heaped over its age, object, and story. Here however it is, a standing wonder; for though the moving of so stupendous a block of granite—the largest monolithic column known in the world—from the quarries, is within conjecture, yet the raising of it to the perpendicular is a mechanical mystery—a mystery still further involved in obscurity on recollecting that so vast a mass stands upon a base little more than five feet square, the whole weight having been discovered to rest upon the fragment of an inverted obelisk. The shaft—of the red granite termed Oriental—is in the best style of taste and workmanship, and almost everywhere preserves its original lustre; but the capital, of a different granite, is without polish, and comparatively inferior in taste. As my reveries on this object, given on the spot while the impressions were warm, were communicated to my excellent friend Baron de Zach, together with the scientific observations and conclusions, and published by him in his *Correspondance Astronomique*, I shall subjoin the letters which I wrote to him in the Appendix, together with his remarks thereupon.

The principal interest which I felt in the matter sprung from an illusive vision, namely, that the column might possibly have been a mark for the north end of the famous degree of the meridian measured by Eratosthenes, an effort as important in astronomical and mathematical science, as the Egyptian monuments themselves are in archæology. Under the influence of such a

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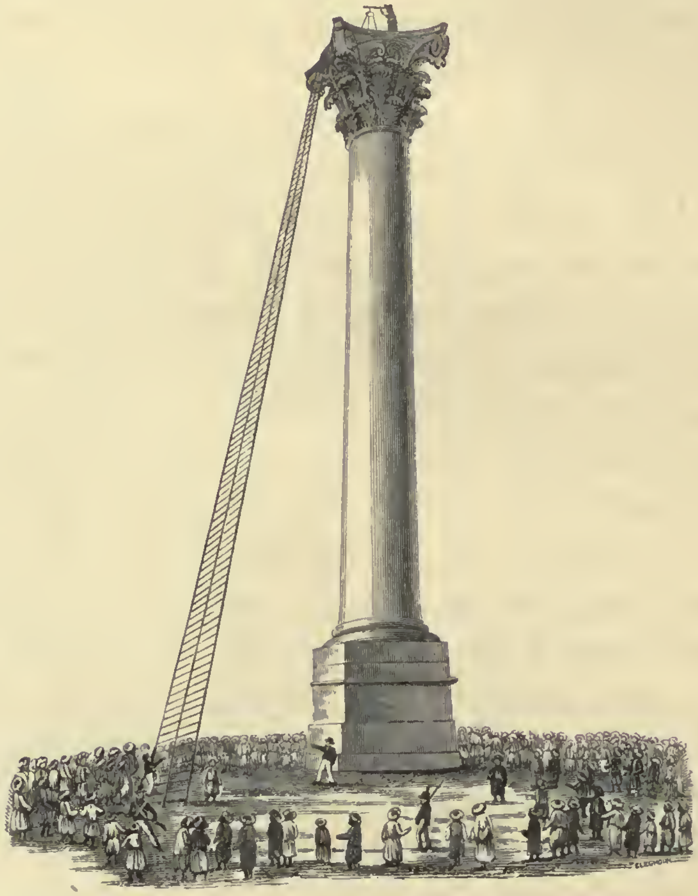
of the soldiers who fell in the glorious storming of Alexandria were engraved on the column by order of Bonaparte. Sonnini, however, was under as gross an illusion in recording names of which not a graven character was discoverable, as in making the waters of the Levant Sea shallow, to bear out Buffon's geological theories, where I took casts of the lead and could obtain no bottom with five hundred fathoms of line; and where Captain Graves, my former shipmate, has since tried in vain with a thousand fathoms.

notion, and as many of the points of the survey which I was carrying on were of course perceivable from such an elevation, I determined to carry up a theodolite, and reap a round of angles from its summit. As every eye was upon all our movements, I considered that the occasion demanded the utmost smartness and promptitude of which we were capable. Every preparatory arrangement was therefore made, not only as regarded the requisite materials, but also in stationing people to the several subdivisions of the undertaking; and both officers and men engaged in the task with alacrity and cheerfulness.

In the first place, a pair of large paper kites were made on board, and the necessary ropes and hawsers carefully coiled into the boats; and when we were all quite ready, I waited on the Basha to obtain his permission for making the ascent. This, he kindly assured me, I need not have asked; but as I was about to plant marine sentinels on his ground, and it was possible that the crews of the Turkish fleet might prove unruly, I considered his sanction a necessary prelude. On his Highness' questioning me as to the safety of the instruments during such an operation, I assured him that the means of ascent should be so sure, that I should be much gratified in conducting him up,—an invitation which he declined with hearty laughter. On leaving the Seraï—from a window of which I had made a concerted signal to the Adventure—I walked through the town, and on the opposite side met my boats landing. The two kites were flying in a moment, nor was it long before one of them conveyed a small line exactly over the capital. With this we hauled up a rope, and with the rope a hawser: a set of shrouds was speedily formed, set up, and well rattled down; and on the following morning I was able to place a very efficient instrument on the summit. In the mean time, such was the density of the turbaned crowd, that it appeared as if all the inhabitants of the city, and the crews of the fleets, had congregated to gaze on our movements; but they quietly toed the ring which we chalked around the pillar, and which was paced by our marines, with fixed bayonets, as steadily as if on their own barrack parade:—



The angles which I took, and other operations, will be seen in my letters to Baron de Zach, before alluded to, in the Appendix. On descending when the observations were completed, I saw a young Sidi whom I had known in Tripoli standing in a group of Turkish officers; and, calling to him by name, I invited him to mount the shrouds. He at once accepted the offer, for hundreds of eyes were upon him; and, on his gaining the summit, the pleased spectators saluted him with a hearty round of shouts. At the request of some of the magnates, I allowed the rigging to stand two or three days, during

Pl. VII

which great numbers of the officers and seamen of the several fleets ascended; and the whole transaction passed in general concord.

After having inflicted the reader with these lengthy strictures, we will now return to the Hartwell Museum, and snatch a hasty glance at the Egyptian vestigia therein contained; but in so doing it may be well to mention, that all the mummied animals will not be enumerated—nor the whole of the little icons or votive figures in stone, porcelain, glass, bronze, or wood; and still less the numerous scarabei, beads, bugles, nilometers, and signet-rings—or the variety of ancient cakes, wheat, dates, nuts, and other fruits found in the tombs at Thebes. Where an antiquary has largely collected, purchased, and received presents for many years, as Dr. Lee has done, the specimens become too numerous for a detailed description in the pages here projected. As the collection, however, is rich in the sepulchral tablets called *stelæ*, they deserve particular notice; especially since the learned Dr. Leemans, of Leyden, took the pains to examine some of them minutely, and to explain part of their inscriptions, which he did in my presence. The first in the order of the Hartwell Catalogue notation is No. 1273. *(See Plate VII.)* This is a beautiful funereal tablet of limestone, bearing indications of being from the neighbourhood of Thebes. It is in the form of a door, with eight lines of inscription; a dedication to Osiris, as the sovereign, powerful, and eternal God, by . . . . . . son of Subsjoug. Under the hieroglyphics, the deceased appears, with a lotus in his hand, before an offering bench, on which are sacred cates: by the side of it is a standing figure, carrying incense. The next tablet, No. 1274, is also of compact Theban limestone, and of very superior workmanship, twenty-three inches long by fourteen broad. It represents a deceased female, Petisis, elegantly attired, and with a singular radiated head-dress, making an offering of cakes and other articles surmounted by a lotus, to three deities—Osiris, Isis, and the hawk-headed Pitempam-enti Horus; under whom are seven lines of hieroglyphics carefully carved. The summit bears the winged globe, emblem of the Omnipotent, over two jackals, with various

symbols. These two *stelæ* were purchased from the sale of Consul-General Salt's museum, on the 14th of May, 1833.

At that great sale, wherein Mr. Sotheby disposed of the choicest rarities in the respective collections of Messrs. Salt and Burton, there were many papyri, both hieroglyphical and Coptic. Of several of these, also, Dr. Lee became the purchaser; and one proves to be a valuable historical relic.

The Papyrus Nilotica has proved itself, to the moral world, one of the most wonderful of plants, in having preserved the expressions of thought with such extraordinary permanence, that the ideas written thousands of years ago are directly read from the writer's autograph at the present day. This must be even more than the most zealous paper-maker among the Mizraimites could have anticipated, for the vegetable tissue is not indicative of such long duration. In Isaiah's prophecy on the "Confusion of Egypt" (chap. xix. verse 7), the papyrus was of sufficient importance to bear a distinct denunciation—"The PAPER-REEDS by the brooks, by the mouth of the brooks, and everything sown by the brooks, shall wither, be driven away, and be no more." Frequent allusions to it are made by the classical ancients; and both Pliny and Strabo describe the Byblus, or Papyrus Hieraticus.

Good old Gerarde, the excellent Master in Chirurgerie, at page 37 of his well-known Herbal, honours it with a set mention, and a very fair illustrative wood-cut. "The paper reede," he says, "hath many large flaggie leaves, rough in handling, and likewise tough, rising immediately from a tuft of rootes compact of many strings, among the which shooteth up naked stalks, square and rough: at the top whereof doth stand a tufte or bundle of chaffie threds set in comly order, resembling a tuft of flowers, but barren and void of seede. This kinde of reede doth growe in the borders of rivers about Babylon, near the citie of Alcaire, in the borders of the river Nilus, and such other places of those countries. The time of springing and flourishing answereth that of the common reede. This kinde of reede, which I have Englished paper-reede, or paper-plant, is the same (as I do reade) that paper was made of in Egypt before the invention of paper made of linen clouts was found out. It is thought

by men of great learning and understanding in the Scriptures, and set downe by them for truth, that this plant is the same reede mentioned in the second chapter of Exodus: whereof was made that basket or cradle which was dawbed within and without with slime of that country, called *bitumen Judaicum*, wherein Moses was put, being committed to the water, when Pharoah gave commandment that all the male children of the Hebrews should be drowned."

This is a pretty fair description, if we except the *square* stems; still I will annex my own account of the same plant, published in my account of Sicily twenty-six years ago. It should moreover be observed, that this plant used to abound in the waters of Lower Egypt, whence it has long disappeared: it is now to be gathered growing spontaneously only at one place in Europe, namely, near the spring or fountain of Cyane, on the river Anapus, near Syracuse. In reference to the locality, my statement runs—"This spring is now called the Pisma, and is a circular basin of the purest water, though, from its muddy bottom, it has a black appearance; it is about sixty or seventy feet in diameter, and twenty-six deep, well stocked with fine fish, and the banks are covered with a luxurious profusion of aquatic plants. From thence to the river, it flows in a narrow, limpid, and quiet but deep stream; on the sides of which the *cyperus papyrus* is found, floating as it grows, in such abundance, that it is used as withes for binding corn and other articles. The principal root runs horizontally near the surface of the water, throwing out long filaments, which descend perpendicularly down, while numerous triangular green stems shoot up to the height of eight or ten feet, crowned on the summit by a fibrous tuft of fine filaments, which, near their extremities, are again subdivided into others bearing small seedy flowerets. It is supposed the papyrus was sent from Egypt by Ptolemy Philadelphus, among other presents, to Hiero, with whom he was on most amicable terms; indeed his estimation in Sicily may be perceived in the panegyrical idyllia of Theocritus, particularly in the seventeenth, and at the close of the fourteenth. Paper, some assert, was made of the yellow pellicle that surrounds the stem near the root; but I have been more successful, by following the directions of Pliny, with the cellular

substance of the whole stem cut thin, the slices laid over each other transversely at right angles, and well pressed. Besides making paper of this plant, the ancients are said to have extracted sugar from it, and to have made cordage and canvass of its fibres." In further illustration of so interesting a vegetable production, I was at some pains in making a correct drawing of it, a reduction of which—engraved by the late William Daniell, Royal Academician—appears in that volume: and here it is still further reduced.

Dr. Lee, feeling at once the interest and importance of this plant, was at the pains of giving two elaborate lectures upon it, in which he detailed all that can be gleaned of its history; and I was gratified on finding that my

drawing was produced in illustration, since he, having himself visited the Fountain of Cyane, was an authority for its fidelity. One of these lectures was delivered at the Mechanics' Institute at Aylesbury, on the 16th of January, 1849; and the other at the Public Library at Bedford, in the following month of April. On the last occasion, after some remarks on certain moral and physical revolutions which the story of the papyrus involved, he made this peroration:—"These facts shew that, under the guidance of Divine Providence, as great changes have and do take place, from time to time, in the botanical or mineral kingdoms of nature, as in the political world, in the destruction of empires and kingdoms. And, although the use or causes of these changes may be beyond our conception, still we may in all humility and admiration of the works of the Almighty ruler of the universe, presume that they are so ordained for the wisest of purposes. Still this ignorance of ours should not dishearten us from constantly pursuing our investigation of the works of Nature: and, as we now know many arts and sciences which were unknown to our forefathers, so we have the satisfaction and encouraging hope to support us in our labours, that what we now do and investigate may be of use and a blessing also to those who may succeed us. The more a person learns of the wonderful works of Nature, the more he will find that his mind and thoughts direct him, from day to day, to ascribe glory to God the Creator, and to pray for peace upon earth, and for universal good-will amongst all his fellow creatures."

Every age—whether we search into particulars respecting the armour of Glaucus, the false denarii of Severus, the lime in Falstaff's sack, or the late Railway bubbles—yields strong proofs that man is not ethnically pure. So even among the Egyptian papyri, where none of us would have expected it, has fraud of the grossest description been practised. Dr. Lee was justified in assuming that every one of the papyri in his collection was of equal integrity with the rest; but the fact proved to be otherwise. As the collection promised a fair harvest of information, Dr. Tattam, the late Professor Schwartz of Berlin, and other eminent Coptic scholars, were desirous of availing themselves of the

adroitness which Mrs. Lee had acquired in unrolling these manuscripts with the assistance of steam. The *sheets* of some of those thus unfolded by that lady, being laid between two thin panes of glass, with a paper guard cemented round the edges, may now be consulted with perfect ease to the consulter, and safety to the manuscripts. But alas! too many of these supposed precious rolls, proved to be "dummies" indeed. For, as the very delicate operation of unrolment advanced, they were found to consist—of course not *ab origine*—mostly of fragments written in various-sized characters, and on different subjects. These pieces were, however, tenderly treated; yet, in the further process, the roll was discovered to be made up of still smaller fragments, till, reaching the middle, a squeezed-up mass, without even an attempt at smoothness, was revealed. At what period this deception was perpetrated, is unknown; but we must regret the circumstance, as the cause of a disappointment equally severe, whether considered under the alternative of assigning the fraud to the ancient priesthood, or the succeeding kalojeri, the usual fabricators and venders of such-like relics.

Near these Coptic vestigia are several mummified cats, dogs, birds, and other animals; and various idols made of Sycamore wood, among which is one that I brought from Egypt and presented to Dr. Lee, as having been noticed by Mr. Salt for its rarity. Two funereal statuettes of the priest Harket (?), son of Skoutsot, are curious from their fabric, and the consistence of the terra-cotta of which they are made. In this division is also the lady's hand with the gilt nails, *ut supra* alluded to, and various ornaments for females, as rings, and necklaces composed of different coloured substances, such as cornelian, jasper, blue porcelain, lapis-lazuli, basalt, and glass. Here also will be found many fine *scarabæi* of *pietra-dura;* a fine bronze ichneumon or Pharaoh's rat; the Egyptian triad—Osiris, Isis, and Horus—in rich blue porcelain; some fine brass arrow-heads; clay stamps for hieroglyphics; Isis suckling Horus, in brass; cats in bronze and in terra-cotta; covers of Canopic jars; and various sacrificial stones of the greatest antiquity. Yet still more remarkable, there are specimens of corn, pomegranates, figs, and dates, perhaps equally old; and

such is the inherent principle of vitality in the wheat, that some of it has actually been re-germinated after having been hermetically sealed, as it were, for many ages in the tombs.

Looking at these mummified creatures, the unpractised spectator will perhaps deem the preservation of such numbers of young crocodiles among the strangest of those vain and fanciful superstitions, *deliramenta doctrinæ,* ascribed to the Egyptians. And it is a knotty point in theory. As the crocodile feeds only on putrid substances, he was held to be a sort of scavenger for the banks of the Nile; and, being therefore useful, and deserving of protection, the priesthood declared it a sacred animal. As usual in such cases, the worship which followed became split and gave rise to sects: so that, while numbers rejoiced when the monstrous reptile condescended to make a breakfast upon their children, and piously embalmed them when dead, others worried it and ate of it; and some even execrated it as the emblem of the wicked Typhon; and treading on a crocodile was the symbol of subjugating an evil power. The ancient name was *kampsa;* for that which is in current use has but a sort of modern antiquity. The Greeks, struck with the timidity of the saffron-coloured lizard of their own country, gave it the name of ΚΡΟΚΟ-ΔΕΙΛΟΣ: and on their arrival in Egypt, finding a huge aquatic creature of similar shape and hue, they applied to it the same designation. In like manner, in more recent times the lizard of the Portuguese, *al ligarto,* became alligator.

Among the porcelain rarities of this department, those curious ornaments usually termed Nilometers, but now recognised as the emblem of stability and knowledge, must not be forgotten, since there are here some remarkably bright specimens, with cross-bars and angles as sharp and colours as fine as when just from the manufacturer's furnace. Though the actual meaning of this graduated symbol may have been mistaken, still the rising of the Nile, and its extraordinary effects, were matters of first-rate consideration among the Mizraimites. Indeed the inundation of this river is used as a figure, in the sacred language, to express the sudden and overwhelming force of armies and other great calamities. Amos the prophet employs it in prefiguring the im-

pending calamity of his nation: "It shall rise up wholly as a flood; and it shall be cast out, and drowned, as by the flood of Egypt." It is still of prime concern, and the annual overflowing is esteemed the greatest of blessings. After the subsidence of the inundation, the face of the country over which the water has flowed is found to be covered with a pure black mould, in which seed is expeditiously sown. A Turkish writer describes the soil of Egypt as being "for three months white and sparkling, like pearl—for three months black, like musk—for three more green, like emeralds—and for the other three, yellow as amber."

There are numerous wooden idols, some of which may be of the earliest date, since historians inform us that carving in stone was a later introduction. One of these, No. 1327 of the House Catalogue, is an image of the goddess Neith in sycamore, seated, as usual, with her hands along her thighs; it is of good workmanship, and probably of the age of Rameses the Great, the son of Osirei, the Sesostris of the Greeks. Next to it is a wooden figure standing, and before him a hawk, the emblem of Horus; this seems to be of very high antiquity, wherefore I procured it by exchange from M. Drovetti, in Alexandria. There is also an Egyptian idol in the resemblance of a negro, which is remarkable, inasmuch as it is the only one of the kind yet found; it was brought from Cairo by Mr. Charles Fiott Barker, and presented to Dr. Lee in 1844. No. 1602 is a fine figure of Cynocephalus, only three inches and a half high, totally covered with hair, and therefore differing from the others, which have only a tippet on them: this was brought from Egypt by the Rev. Henry Tattam, Archdeacon of Bedford, and author of the Coptic Dictionary. No. 1603 is a wooden figure on which is engraven the prenomen of Amenoph, the Memnon of the classics. It was taken from the tomb which poor Belzoni discovered in the valley Biban al Moluk; in which was a chamber containing some thousands of these objects, to which visitors helped themselves as they listed. Still several bushels were left in 1826, when they were destroyed by an artist who was occupied in drawing the antiquities of the valley, and wanted wood for cooking his chops.

Pl. VIII.

The next of the sepulchral stelæ is one of limestone, nineteen inches high by eleven broad, and is No. 1275 of the Hartwell Catalogue. There are four lines of horizontal hieroglyphics, above a man whose hands are uplifted in supplication, and making an offering of cakes, lotus, and a goose to Osiris, as the all-powerful sovereign God: this supplicant represents the deceased Pepi, attendant of the "prayer-room" (temple?), and in the act of worship. *(See plate VIII.)* Lines of vertical hieroglyphics separate the subjects. In the lower compartment are the wife, mother, and sister of Pepi, each of them holding a lotus-flower and smelling it: this is among very numerous evidences that the lotus-lily was a general favourite with the ladies, and Solomon's hymeneal canticle to the Egyptian princess alludes to this national taste, making her say —"My beloved is gone down into his garden, to the bed of spices, to feed in the gardens, and to gather lilies. I am my beloved's, and my beloved is mine; he feedeth among the lilies."—Solom. Song, vi. 2, 3. *(See page 182.)* This stela is very singular, on account of its tints. The inscriptions are written in blue characters; he who prays has blue hair, with a blue collar and a white girdle; and Osiris, attired in white, is depicted with a blue face and hands, standing on a blue *suggestum;* the ladies are represented in white clothing, with brown features and blue hair; the goose of sacrifice is white, with a blue head; one of the dedicated cakes is white and the other yellow; and the vase has some red liquor in it. Two of the hieroglyphics at the beginning, which appear to be cakes, are tinted with yellow.

No. 1276 is a smaller stela than the above, being only twelve inches in length by nine in breadth, and is also of compact limestone, elegantly sculptured. It represents the deceased and his wife standing in the attitude of adoration, and making an offering of a lotus, cakes, and other articles to Osiris, who is standing in a recess *(ναοσ)*, or shrine. In the lower compartment are two brothers and two sisters of the deceased, with inscriptions around them, and there are six rows of vertical hieroglyphics over the worshippers and their offering. This is also a tinted tablet, the defunct lady being red, with black hair, the men below red, and the sisters brownish.

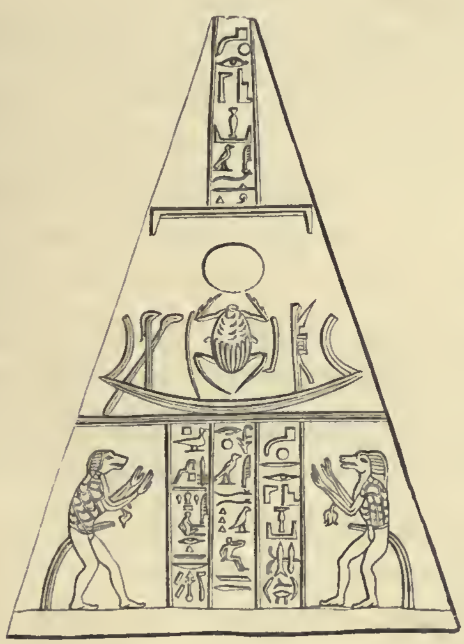
The next funereal slab is of limestone, twenty-two inches long and thirteen inches broad, which is No. 1277 of the Catalogue. It is rather complicated in its details: the deceased is represented on both sides of the central portion invoking two couchant foxes or jackalls—guardians of the tropics. On the right side of the lower part is the deceased, sitting, worshipped by his kneeling mother or sister; and on the right side are his wife and his father, before a table covered with offerings. The whole is thickly sprinkled with attributes and hieroglyphics, among which is the consecrated cake with a cross *(sacred bread, hot-cross bun?)*. This was one of the articles of Mr. Barker's collection, and sold by Sotheby and Son, in March 1833.

It is evidently in commemoration of a person of some note at the time it was cut, but as his story is unsung, it of course remains unknown—

> Vain was the chief's, the hero's pride,
> He had no poet—and he died:
> In vain he fought, in vain he bled,
> He had no poet—and is dead!

No. 1284 is an exquisite specimen of a memorial, which is hardly so rare as it is complete and curious. It is a small pyramid of limestone, about two feet high, with its four sides elaborately engraved, the two opposite of each being very nearly alike; that is, Nos. 1 and 2, and 3 and 4, are in strong resemblance, though the inscriptions differ. On two sides we see the recumbent jackall seated on an altar or tomb; but in one case it is open and in the other closed. These animals are watching a taper, the emblem of the soul, a symbol of Anubis as the conductor of souls. Below the jackall is a female figure kneeling on her right knee, and in the act of adoration. There are two columns of perpendicular hieroglyphics in front of one female, and three in front of the other; one column of inscription above the jackall is very nearly similar on each side. The two other sides of the pyramid each bear two apes in the position of prayer, but they vary in one having two columns of vertical hieroglyphics, and the other three, between the apes. Over them,

and occupying the central part of the pyramidal face, is the *bari,* or sacred boat, in which is a scarabæus supporting the globe; and above it a column of inscription reaches to the apex. The boat does not exactly represent the funereal barge which was used to convey the mummies to the tombs, and which bore the sacred eye of Osiris on the bow, as with the Roman galleys in after-ages, and the Chinese joncks and Mediterranean spironare to the present hour; but the symbols it carries shew the importance of its character, and are also typical of an aquatic people; for, while the Egyptians thus place the supreme attributes in a boat, the Greeks would have disposed of them otherwise, as, for instance, their Apollo, or Sun, in a car. The following wood engravings represent two of the sides of this fine little pyramid:—



It may safely be presumed that there were offerings of small pyramids —symbols of what Sir Thomas Browne calls "those wild enormities of ancient magnanimity"—in funereal rites, since the hieroglyphical inscriptions expressly

indicate that they were thus consecrated. Mr. Cullimore suggests that they illustrate the connexion of the principle of the great pyramidal piles with the *apocatastasis*, or great cycle of renovation, mythologically indicated by the life of Apis: and the same diligent Orientalist makes this remarkable mention of one of the symbols before us—"On one face of the pyramid appears the solar or mundane boat, having in it the globe, or emblem of the world, accompanied by the scarabæus, the emblem of the sun, of life, and generation, to denote that the voyage through the upper hemisphere—that of light and life—is here depicted; while on the opposite face is the same boat and globe, without the scarabæan symbol, representing the voyage through the lower hemisphere—that of darkness and death—in the same way that it appears on the funereal representations in general."

We now come to No. 1619 of the Hartwell Collection: this is a singular sedent statuette of a hierogrammist, or royal secretary, with a good countenance, and so elaborate a head-dress that it was considered to represent a female. From the hieroglyphics inscribed thereon, however, it is pronounced to be in commemoration of Sabacotph, an officer in the company of archers. The figure is of limestone from Gorua in the Thebaid, and the position is supposed to be peculiar to this class of Pharaoh's subjects; but it is one of those puzzling crouching representations of which various examples are to be found in the British Museum. I am not aware that any mummies have ever been found in this attitude, so placed by the early Egyptians, though dried bodies are found thus contracted in Teneriffe and Peru; from which last country, while writing this, a specimen has been received by the United Service Institution, swathed in cloth, and accompanied with ornaments and Indian corn, as with the Mizraimites. Should any such forms be hereafter discovered in the Valley of the Nile, it would add another singular ethnological coincidence between the old and the new worlds, to the many which are known to exist. Figures in this position may be seen in Lord Kingsborough's plates of the Antiquities of Mexico; and in the Selden collection of MSS. in the Bodleian Library (Arch. Seld. A. Rot. 3 Cat. MSS. Angl. 3207) there are five individuals in nearly the same attitude.

These vestiges of similarity are certainly wonderful; especially when coupled with the pyramidal style of architecture of men so widely separated, their tenure and barter of property, their hieroglyphic or picture writings, their uncompounded colour paintings, their human icons with animals' heads, their belief in a triune God, their aversion to red hair, their established distinction of ranks and separation of professions, their worship of the flamingo and ibis, their similarity of taste in the Keramic art,* their manufacture of paper from vegetable substances, and their ignorance of coined money, though using gold and silver ornaments in profusion. *(See pages* 181 *and* 184.*)* Indeed the resemblance between these people is in every way striking. Sir Thomas Phillipps shewed me, at Middle Hill, a manuscript history of "Nueva España, por Fr. Diego Duran," in which is the representation, from a very ancient Mexican drawing, of the removal of a huge block of stone by a host of men hauling at long ropes, exactly in the style of those in Rosellini's drawings of similar operations in ancient Egypt. The title to it is, "Cap. 66.—De como mandó Montezuma buscar la mayor piedra que se hallase para el sacrificio del desollamiento y de lo que en traella à Mexico sucedio." Nor can we contemplate the

* This is shewn in a great variety of urns and pottery, among which may be instanced the double or yoked bottle (bijugué), and the facial vases. In the summer of this year (1850), Mr. N. N. Solly, of Port Madoc, shewed me a large drawing of a "jug" that had been found in 1828 in one of the haacas or ancient tombs at Truxillo in Peru, the taste of which is so identical with some I disinterred in Magna Græcia, that I requested a copy for the Society of Antiquaries. The following miniature representations may serve to shew the Peruvian vase, with two Greek ones which I presented to the United Service Institution in Whitehall Yard—

numerous monuments of human labour and design which stud the Valley of the Mississipi without acknowledging that, as yet, all theory is but fanciful, and only takes "a deepe plonʒe into archæologicall mudde." The flint arrow-heads found in the Mississipi earth-works, are precisely similar to some which I gathered in considerable numbers out of the great tumulus at Marathon: "Rem vidi, causam non vidi."

Unable therefore to unravel the mystery, without supposing migrations somehow or other from Asia into America, we will return to the Hartwell Museum, and take a fresh departure from the hierogrammist who excited the reflections just enumerated. Near him is a sandstone fragment from the temple of Rabek, marked No. 1321, which is interesting because it shews Rameses bearing a cone upon his left hand; which cone appears to be similar to those in baked clay found in abundance at Thebes, and of which there are here several specimens. It should be observed, that some of these relics are of the nummulite limestone from the Lybian Desert, of which the mass of the great pyramid is formed; the white coating stone having been brought from the Arabian side of the Nile.

No. 1888 is a remarkable tablet of Theban limestone with a curved summit, sculptured in relievo; it is broken at the lower left-hand corner, but the inscription appears to be complete. This was accurately drawn and lithographed by Mr. Bonomi; according to whom it represents a personage whose name was Shemmo, seated on a high-backed chair holding a lotus, and receiving incense and libations from his daughter Temon. Beneath are two lines of hieroglyphics, which may probably mean as follows:—in the first line, the royal offering to Osiris, the great god, that he may give an abode provided with flesh and fowl, for the sake of Shemmo, to his daughter. In the second line his name occurs again, and consequently is verified. The tablet is partly coloured with red pigment: and the hieroglyphics in the upper part, above the two figures, are the names of the persons represented, which names are repeated in the two lines below them as already mentioned.

No. 2151 is a singular soft-stone relic, brought from Thebes by R. Coster,

Esq. being the figure of no less a personage than the mighty King Thothmes the Third, in the attitude of a corn-grinder, or bread-maker; the potent monarch is on his knees, holding a roller on a rubbing-block, and wears the "shento" round his loins, with the leopard-skin which was appropriated to high priests. On the plinth upon which he is kneading there has been an inscription traced in black linear hieroglyphics, though it is unfortunately much mutilated; but there is sufficient to shew that the dedication was to the God Anoup *(latrator Anubis)*, in the divine abode of Tanoor. This Thothmes the Third *(Sesostris)*, is considered to have been the Pharaoh in whose reign the Exodus of the Israelites occurred. The Duke of Northumberland, however, in a critical discussion of the chronological authorities, places that momentous event in the reign of Pthamenoph, the last king of the eighteenth dynasty, or nearly two centuries earlier than Thothmes. This point is a grand datum-step in the records of the world, and it is to be hoped that further light will be thrown on it by the erudite researches of the Prussian Ambassador, Chevalier Bunsen, in a work which he tells me is nearly ready for publication.*

Near this relic is No. 3097 of this series. It is a large tablet—forty inches long by thirty-two broad—supposed to be the most ancient and rare in the collection. It has two lines of inscription in the upper division, in which the characters are three inches high, very sharp, and deeply cut: and there are some hieroglyphics, with two persons in the lower compartment sitting at a table, on which is an offering. On each side of this compartment

* The absence of absolute confidence in dates is a serious evil. While some chronologists assume the Christian era from the commencement, others take it from the termination, of the year of our Saviour's birth: and even that is clouded in uncertainty. The epoch called "verus annus," or the true year of the birth of our Lord, seems to be two full years earlier than the vulgar era: and from the uncertainty of the different epochs—the late date of the institution of the Christian era—the different computations of the reign of Herod and the thirty years before Christ commenced his ministry—such insuperable difficulties are presented, that Spanheim and Vossius are of opinion that it is impossible to determine the true year of our Saviour's birth. But after gazing over Egyptian relics, the difficulties of sacred chronology appear still greater, especially relative to that material epoch the Flood. By the Hebrew text, it took place 1656 years after the Creation, and by the Samaritan only 1307; yet the same interval, according to Eusebius and the Septuagint, is 2242 years; according to Josephus, 2256; and according to Petavius, 2262 years. *(See page* 171.)

are four canoes—*navigia, cymbœ*, or boats—placed exactly one over the other; they are not of the sacred order called *bari*, but were probably only intended to represent those vessels which were employed in the common navigation of the Nile. These simple embarcations seem to have been dedicated to Anubis and Haroeris by the deceased Hortihou and Hathorenonh, according to the rendering of the learned Dr. Leemans. This stela, in Mr. Bonomi's opinion, came from one of the tombs in the vicinity of the pyramids of Gheezah, and is made of stone from the opposite bank of the Nile. Be that as it may, it it is clear that the person from whose tomb it was taken was one of authority as well as lineage; for behind his chair is the staff of office, and the sceptre called *paot*, usually carried by men of rank and fortune. One reason for assuming that the paot symbolized affluence as well as station is, that the tombs in which this attribute is represented are always larger, and more costly in decoration, than those where the staff only appears. The wand or staff, however, is always a mark of authority; and it is worthy of note, that during their sojourn in the peninsula of Sinai, the heads of the Israelites were commanded to carry staves with their names inscribed upon them. Such wands, so written upon, have been found in Egypt: and probably from this the ραβδον of the Greeks, and the *hasta pura* of the Romans, became typical of divinity.

The archæologist will recollect the similar origin of the *paot*, sacred javelin, crozier, pastoral rod, mace, truncheon, and staff of office; and that the sceptre itself, as an ensign of royalty and command, is of greater antiquity than the crown. The kings of Egypt were consecrated at Memphis, carrying the yoke of Apis and a sceptre in the shape of a Theban plough,—the which was originally little more than a crooked stick. The Greeks had a plain staff like a hunting-pole: Agamemnon's was afterwards worshipped at Cheronea; and that used by Ulysses to chastise the insolence of Thersites, was a formidable weapon—

> "He said, and cowering as the dastard bends,
> The weighty sceptre on his back descends;

PLATE 9

C. E. [illegible] J. FAED SCULPT

On the round bunch the bloody tumours rise;
The tears spring starting from his haggard eyes:
Trembling he sat, and, shrunk in abject fears,
From his wild visage wiped the scalding tears."

This fine specimen was No. 235 of the sale of Mr. Salt's Egyptian antiquities, disposed of by Mr. Sotheby on the 16th of March, 1833. Two or three of the hieroglyphics are damaged nearly to obliteration, and look as if they had been purposely chiselled out. The Rev. G. C. Renouard suggests that this may have been done in order to efface some particular name, which was unpopular at the time; or to please some one of the conquerors of Egypt. Near this is a small funereal tablet, full of mysticism, marked No. 3188. It is elaborately sculptured with figures, hieroglyphics, and offerings; and is moreover remarkable in having the upper part arched, with two lines of horizontal inscription on what may be termed the pediment. There are two females sitting with lotus flowers in their hands before a table covered with cakes, ducks, an ox-head, and other edibles, in the upper compartment; three females also, with the lotus, kneeling in the middle field; and two others kneeling in the third or lowest compartment. There are perpendicular hieroglyphics between these women, and two lines of horizontal ones at the base: in the last line the sacred cake, marked with a cross, is sharply represented.

The mummied *ælurus*, or cat, near the stela, draws us to an extraordinary feature of Egyptian worship, or symbol of worship, as exhibited in some colossal basalt statues of Bubastis or Pasht, the Diana of Mizraim, which were purchased by Dr. Lee at the sale of Mr. Barker's collection, in 1833. *(See plate IX.)* These figures, being too great both in weight and magnitude for reception into the Museum, are accommodated with a roomy hall at the stables, at about a couple of hundred yards to the north-west of the house, where they sit in grim array. These huge divinities are cat-faced, in honour of the tutelary deity of the city called Bubastis, sacred to the moon, the Pibeseth of Scripture; in token of which an imperfect or dichotomized disc,

about a foot in diameter, surmounts the figures, except in one or two, where it has been broken off by accident, or by the blows of the iconoclasts. The rest of the figure is human, conventionally stiff and lanky, in a sedent posture, their hands on their knees in token of tranquillity, with the *crux ansata* held in the right; and they have bracelets and anklets engraven, with much ornament on the busts. They are seated on massy thrones, the sides of which are marked with the usual emblems of "Ægyptus Inferior and Superior;" and assuredly they seem to be fully typical of repose and stability. The studied sameness of the bodies with each other is a consequence of the laws having rendered the making of them almost wholly a mechanical process: the art of sculpture being limited by such strict rules, that there were fixed proportions established for every sacred figure, which the statuary was not permitted to violate: still it will be confessed that Egyptian sculptures, although deficient in the roundness and elegance of those of Greece, have a singularly majestic effect—an effect which even the exclusive idolators of Grecian art must admit.

The cat enjoyed a much higher degree of favour in Egypt than elsewhere, and the numbers which were mummified testify the regard in which the animal was held. It was believed to supply a cure for the bite of asps and other venomous creatures, and was considered to be specially under the protection of Pasht. Cats were taught, among other practices, to catch birds for their masters.

The Hall of Bubastis, to coin a name, contains other Egyptian relics besides these basalt statues. A sand-stone monument from Nubia, No. 3189, called an oblation stone, bears a double inscription, with two offerings of consecrated cakes, cups, and other articles. It is twenty-two inches long by fourteen broad, and has an oblong cartouche in one of the inscriptions, showing that the sacrificial table is dedicated by Amonmes, the son of Ioa.

Close to this tablet is a fond little couple about two feet in height, seated side by side, with one arm of each round the waist of the other, and with cheerful faces, that of the man being painted red, and the woman's yellow. Both have had their black hair carefully dressed, and a tight white vestment

covers them from the waist to the ankles; down the front of which, on each figure, a legend was engraven, which is supposed to have been anciently and purposely erased. On the sides of the chair there are hieroglyphical inscriptions, of six columns each, wherein it appears that the man is described as the Royal Secretary of the Treasury at Thebes. They most likely represent the parents of the person by whose order they were sculptured; being obviously of a votive nature. This neat little monument—the husband and wife united after death by the hand of the sculptor—was No. 242 of Mr. Barker's sale, 14th March, 1833; and is No. 3190 of the Hartwell Catalogue. Mr. Bonomi thinks that it is made of sand-stone from the quarries of Jebel Sizili, a few miles north of Koum Ombo. The following specimen of Mr. Cleghorn's cutting represents the couple:—

The next, No. 3191, is a crouching statuette of twenty-eight inches in height; which, from having a shrine of Osiris before him, his attitude, attire, and the symbol which he holds, is considered to represent a priest. There is

a row of inscriptive hieroglyphics around the base on which he is seated; and from the nape of the neck down his back there are two perpendicular lines of characters. It is carved out of grit-stone of the same quality as the so-called vocal statue and its companion on the plain of Thebes; and therefore supposed to have been obtained at the quarries of Jebel Akhmar, between Heliopolis and Cairo, the only known place in this region where this stone is procurable. It was in Mr. Salt's collection, and is said to have been brought from Abydos.

Among the objects in this hall, No. 3192, the coffin of a lady named Smantennofre, is one of peculiar interest from its singular preservation, and is fairly represented on plate X. in four compartments. Figure 1. is a front view of the outer case, which is of sycamore wood in high perfection, ornamented in various colours, representing the face of the mummy, and a line of hieroglyphics down the centre; the latter contains the usual funereal ritual, running thus—"This is a (royal?) chosen gift to Osiris, Dominator or President of the West, the Good God, Lord of the Land of (Abydos?). Give chosen offerings of oxen, geese, incense, and libation for Osiris, the lady of the house, priestess of the (sacred abode?), Tan'nofre . . . . ." Figure 2 represents the inside or inner part of the case, wherein is painted a figure of the goddess Netphé, the sister of Seb and mother of Osiris; who held one of the principal offices in the regions of the dead, and is frequently shewn in this form and position in Egyptian sarcophagi. Figure 3 represents the inner case, the ornamental details of which are arranged in compartments on the upper side of the figure, with a tachygraphical line down the centre. Immediately below the breast-plate of necklaces are the winged globe and asps, emblems of the God Knuphis or Agathodæmon. The upper divisions contain, on the right, two of the genii of Amunti, Hapee and Smof, standing before an asp crowned with the cap of the upper country; and on the opposite side the other two, Amset and the hawk-headed Kebhnsnof. In the next, are represented two winged asps; and in the lowest, there is on one side a jackal-headed figure, and on the other a hawk-headed one with the ostrich-feather of truth. The line

Fig. 1.

Fig. 2.

Fig. 3.

Fig. 4.

J. Basire, sc.

Coffin of the Mummy of a Lady named Smantennofre.

of hieroglyphics contains the general formula of funereal inscription, and, as far as the sense can be ascertained by Mr. Pettigrew, it signifies—"This is a chosen gift to Re Atmoo, Lord of the two regions of Phut (or the Lybian side of the Nile), Pthah Sokari Osiris, Lord of the Sacred Place, the Manifester of Good, King of the Gods, the great Ra, Lord of Heaven. Give chosen offerings of incense for Osiris, the lady of the house, priestess of the (sacred abode?), Tan'ofre, deceased." Figure 4 shews the manner in which the cartonage is secured; for it will be remembered that the inner cases are made of many layers of gummed cloth cemented together, and plastered with lime on the inside. They are as firm as a board, and require to be sawed through to get at the body; which last is enveloped in linen bandages, still retaining considerable strength after enduring an age of perhaps three thousand years.

No. 3193 is a large funereal statue in the form of a mummy-case, standing on a base which, from its boldness of design and elaborate ornaments, cannot but attract attention. The figure is that of the "lady of a house," as wives are called, and a medallist would deem her a full-grown and well-spread woman. The whole has undergone a very careful examination by my learned friend Mr. Birch, of the British Museum; and, although he does not deem his translation of the hieroglyphics to be rigorously exact, I cannot but follow him in so interesting a beat. It, at least, yields a glance into the extent of meaning borne upon these figures; and we cannot but call to mind that the worship of "graven images" had its origin in the east, which alike cradled religion and nursed superstition. This relic was brought from Egypt by Belzoni, in 1819.

This statue then, according to Mr. Birch, represents a married lady named Ta-na-ua, daughter of Har, a priest of the God Mentu, and of a lady named Nesmut; she is also grand-daughter of a scribe of the things brought into Thebes—a publican, as our version of the New Testament translates a similar function. The lady's hair is elegantly bound with a wreath, having in front the vulture, emblem of rank and maternity; and round her neck is a collar, below which is a representation of the outer reticulated coat of mummies.

On the breast is the goddess Nupe, kneeling and winged, stretching out her arms and pinions; her name is written in the disc on her head, and she kneels upon a bolted gate, being thus depicted to represent the mystical spreading forth of the canopy of Heaven. Here follows a peculiar prayer,* and then two judgment scenes: in one of the latter, Thoth introduces the deceased into the Hall of Truth, before Osiris, followed by the four genii of the dead; in the other the same scene takes place in presence of Phthah Soctaris. The next horizontal line, the speech of Nupe (Heaven), "who produced the gods, and has given meals of food and drink, veal and geese, all good and pure things, incense and clothes," to the deceased. The following compartment represents the *amunti*, each in a shrine, and each uttering the same speech—"I am thy beloved son, O Osiris; I am daily at thy side." Below this, a band of hieroglyphics contains two speeches of Seb, the father of Osiris, who says that "he gives food," or "meals of meat and drink, veal and geese, to Osiris." In the next division, are two figures of Anoup holding the bandages of the embalmers; and they declare that they have furnished meals of clean and delicious things. The succeeding inscription is one in which Atum announces that he gives incense to Osiris; which is followed by representations of Horus and Seb, both of whom state that they have given Osiris a good embalming in the cemetery of the western hills of Thebes. The band beneath this contains the titles of Amun-Ra—"the Light of the Earth, the Good God, Lord of Heaven, the Superior of the Gods," twice repeated; and under them are the two sacred eyes of Horus. Below this are two female *jeni*, or professional mourners and layers-out of the dead; behind whom is the dual form of Thoth, singularly seated. In the lowest compartment, or that which covers the feet, are the two couchant jackals significant of the solar path, above the goddess Isis, who, with widely expanded wings, and wearing the type of Upper and Lower Egypt, is in the

* The *prayers* on the bust of this mummy-case will be found in Sharpe's "Egyptian Inscriptions," plate 52; where the lines one to forty, including all the horizontal ones on the right side, comprise the fifty-seventh chapter of the great funereal ritual (*Lepsius Todtenbuch, tab. xxii. c. 57*), the title of which is,—"The chapter of breathing the winds, and prevailing over the water in Hades."

attitude of protecting the remains of her brother. The central vertical line of inscription is the usual dedication, a kind of *Orate pro animâ*, to Osiris, Lord of the West, Great God, Lord of Abydos, who hath given offerings of *kuphi* (sacerdotal incense) to the deceased.

Such are the abstract relations of this interesting relic, but Mr. Birch has gone considerably further with the details; and he finds two chapters of the funereal rubric on the inside of the coffin, one of which is "of knowing the spirits of An," and the other "of knowing Tum or Atum, and Athor, the Spirits of the West,—which are under rigid investigation: there are, to be sure, some difficulties in the complete unravelment, which, however, he hopes to overcome. Meantime I trust that enough has been said to shew that Egypt ought to be sedulously studied, in order to place on a sure foundation historical and chronological matters, which till lately seemed to be involved in inextricable obscurity. Much has been done: and, even though many may hesitate in conceding that we have arrived at unquestionable conclusions, still the extraordinary and early progress of the Egyptians in architecture, in sculpture, and in all the arts of life, as attested by imperishable remains, presents a remarkable and undeniable phenomenon. The whole country, indeed, is an illustrated colossal monument of a people highly-cultivated and important long before Homer wrote a line; and a treasury of historic knowledge, which the recent application of the phonetic key has partially opened. The most marvellous of the stories told by Herodotus and Diodorus Siculus may not, as yet, obtain implicit credence; yet many of their assertions have been fully proved in the recent researches, and more especially in all that relates to mummies and the preparations for making them, in which the Semitic practitioners assuredly evinced a high degree of practical knowledge in chemistry. The veneration for the dead must be viewed in a two-fold light; in the religious feeling mentioned on page 169, and a moral veneration for the departed. "What the Egyptians performed after the death of each of their kings, clearly evidences the great love they bore to them. For honour done him that cannot possibly know it, in a grateful

return of a former benefit, carries along with it a testimony of sincerity without the least colour of dissimulation." A thorough-bred Mizraimite would have adopted the beautiful lines of Southey—

> My thoughts are with the dead; with them
> I live in long-past years;
> Their virtues love, their faults condemn,
> Partake their hopes and fears;
> And from their lessons seek and find
> Instruction with an humble mind.

THE EGYPTIAN STRUCTURE OVER THE HARTWELL FOUNTAIN.

[See page 156.]

CHAPTER IV.

ORIGIN OF THE HARTWELL OBSERVATORY. THE TRANSIT-ROOM. THE EQUATORIAL TOWER. MR. EPPS'S MERIDIONAL OBSERVATIONS. THE DOUBLE STARS MEASURED BY CAPT. SMYTH: COLOURS OF THE SAME: AND THE STORY OF γ VIRGINIS. ENCKE'S COMET. THE METEOROLOGICAL DEPARTMENT.

§ 1. ORIGIN OF THE OBSERVATORY.

Frequently passing through Bedford to his seat at Colworth, and attending the local assizes as a county magistrate, Dr. Lee was wont to favour me with occasional visits; and, having always been an ardent admirer of Urania, he felt the enjoyment of a little practice, as well as the advantage of a good telescope, easy to manage, aud always ready for use. I do not accuse him of violating the tenth commandment, but it was clear that he would not remain much longer without seeking the means of penetrating space. And thus it happened.

In December 1828, soon after I had completed my observatory at Bedford, and mounted the instruments lent by the Astronomical Society for that purpose, it was communicated to me that the telescopes, clock, transit circle, portable transit, and numerous other articles, which had belonged to the late Rev. Lewis Evans, were to be disposed of by private sale. On viewing them, I was rather chagrined at the circumstance not having occurred before my arrangements were carried into effect; especially as the circle seemed to me greatly superior in simplicity and efficiency to Colonel Beaufoy's, with

which I had just commenced operations. (See my Cycle of Celestial Objects, vol. i. pp. 333 and 335.) On mentioning this to Dr. Lee in the evening, he resolved to make the purchase, and to present the circle to the Astronomical Society, with the understanding that it was to change places with the one at Bedford; a transaction which accordingly took effect.

This beautiful transit-circle being thus disposed of, there still remained a considerable quantity of instruments with Dr. Lee, of which he shortly afterwards became desirous of making a proper use. On being consulted, I recommended that the small transit-instrument should be mounted on a pedestal in the South portico of Hartwell House, where it would command all the Greenwich stars from the zenith nearly to the horizon; the adjoining strong-room then could be fitted for the clock and other instruments, and the requisite books and catalogues; while a second stone pier was proposed to be erected at a little distance in front of the portico, on which to place the reflecting-telescope. This proposition was adopted, and, with the help of Dr. Lee's staff of domestic artisans, I soon carried it into effect, insomuch that, having approximated the meridian pretty closely, the moon and several stars were observed on the 3rd of April, 1830.

I should here mention that the transit was a portable one, of twenty-four inches in length, on a cast-iron stand, by Carey;* and the reflecting telescope is of five inches and a half aperture, with a focal length of thirty-six inches, having a good finder and several eye-pieces, on a stout brass tripod. The clock was made by Mr. R. K. Barton, of Ramsbury in Wiltshire, and exhibits a capital train of wheel-work to a Graham's dead-beat escapement. It is fitted with a novel pendulum, expressly made for the Rev. Lewis Evans by his friend Troughton, who had just invented it. In the construction of this ingenious application, the apparent rod is a cylindrical tube of brass, reaching from the

* This transit-instrument was afterwards lent to the Euphrates Expedition under Colonel Chesney, and went to the bottom of the river in the ill-fated iron steamer which foundered there in a heavy squall. It was, however, recovered, and restored to Dr. Lee, who has now lent it to Mr. Lassell, of Liverpool, as an aid to his mighty equatorial reflector.

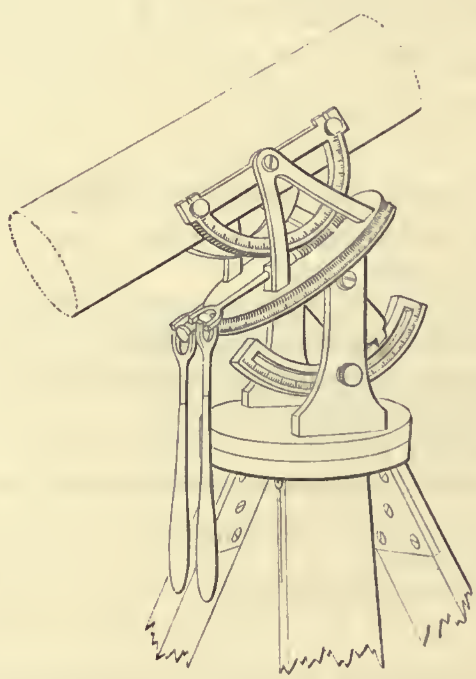
bob to the suspension-spring. This contains another tube with five wires inside it, so disposed as to produce three expansions of steel downwards, and two of brass upwards. These lines of wire are so proportioned as to length, that they act inversely upon each other's impulses, and by the combination destroy the effect that either metal would have singly. In this contrivance the estimable artist reasoned well, and the attempt was worthy of him: but it so happens that the main variations by which the instrument is affected are owing to the outer or covering tube, and, even were this removed, it would still be liable to the jumps and irregularities incident to gridiron pendulums. Troughton therefore soon abandoned it as a failure.

It should be mentioned that the said strong-room, besides being the repository of the fixed instruments, contained also various portable ones, and presented sufficient means for much good work, terrestrial as well as celestial. Of these I may instance the following:—

A reflecting circle by Troughton, with counterpoised stand, and an artificial horizon.
A ten-inch brass sextant, by Ramsden.
A five-inch sextant, by Ramsden.
A quadrant of eighteen inches radius, by Nairne, with diagonal graduation.
A quadrant of twelve inches, by Liverton, of Liverpool.
A trough, framed glass, and mercury bottle for artificial horizon.
A seven-inch theodolite, and tripod stand, by Carey.
A small azimuth compass, in a brass box.
A ten-inch surveying compass, with sight vanes and a tripod.
A surveying spirit-level.
A clinometer of six inches radius.
A circular protractor of six inches in diameter.

Hence it will be seen that the little observatory was richly furnished; and it had, moreover, an abundance of lenses, coloured glasses, barometers, thermometers, and hygrometers. There were two or three telescopes, of which the Gregorian already mentioned was the best; but an old one deserves notice for its tolerable performance: it is a vellum eight-drawer "spy-glass" of ten feet in length, having a single object-glass two inches in diameter, made by

the celebrated Giuseppe Campani, of Rome. Besides which, in the winter of 1829, when I became possessed of Sir James South's six-inch object-glass, I transferred to Dr. Lee a fine five-foot telescope of three inches and three quarters clear aperture, which had been specially made for me by the elder Tulley; and which proves to be one of the very best of its order. This instrument is powerfully fitted with a range of eye-pieces varying from twenty to eight hundred times,* coloured glasses, adapters, prisms, and micrometer; and, being mounted on a stout equatorial stand, with rack-work motion and all necessary appliances, it formed a powerful addition to the means in hand. The solidity and efficiency of the portable mounting entitle it to notice—



Such was the first observatory at Hartwell, which, small as it was, created

* In mentioning the whole range of eye-pieces, I should remind a beginner that the working ones are those which magnify from seventy-four to two hundred and sixty-two times, as severally marked on them. The higher powers are merely for extreme experiment.

a desire in Mr. Thomas Dell, of Walton, near Aylesbury, author of the volume of Evening Amusements for 1832, to possess also a clock and transit-room; and I accordingly, at the request of Dr. Lee, superintended the erection and equipment of one for him. The two establishments were to be worked in emulation of each other; but scarcely had the good Doctor conquered the difficulty of watching the stars across the wires while transiting, than he yearned for more power, and consequently a larger sphere of utility in the Uranian cause. His Alma Mater had instilled the physical theory of astronomy into his mind, and practice brought the conviction of its, so to say, tangible advantages.

> While thus we penetrate ethereal space,
> And Heav'n's wide expanse so minutely scan,
> God's wisdom, pow'r, and handiwork we trace—
> The noblest study of aspiring Man.
> New systems open to us as we climb;
> Each glittering star gives law to circling spheres,
> Which run eternal rounds in faithful time,
> Nor err one moment in ten thousand years!
> Perpetual motion Heav'n's high works maintain,
> So often sought on earth, but ever sought in vain.

Besides contemplating the admirable balance and beautiful arrangement of the starry firmament, he now perceived the harmonious connection between the refinements of science and the wants of every-day life; and he hoped that the labour he chose to bestow upon astronomy might, while gratifying himself, be of some practical use in the end. I had the honour of being therefore again consulted upon the subject, and readily yielded my aid on the occasion.

§ 2. THE TRANSIT ROOM.

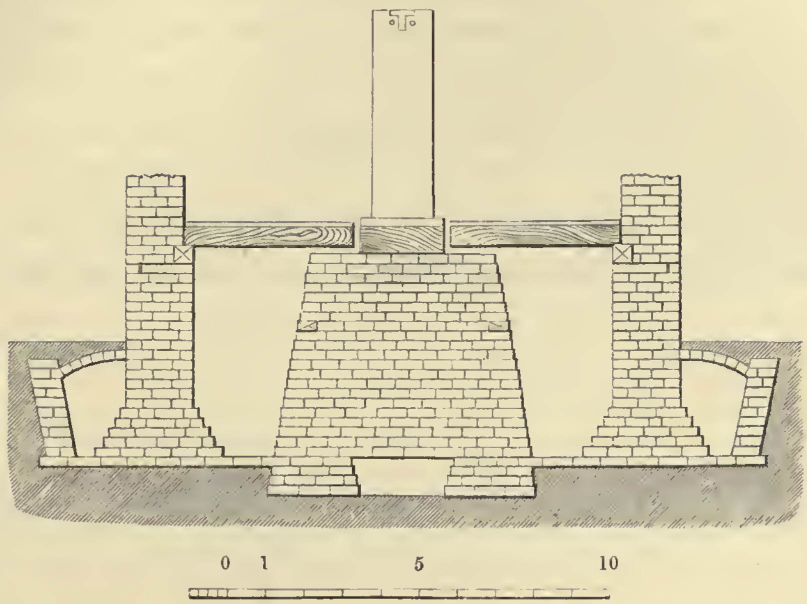
From the sloping nature of the ground on which Hartwell House stands, and the mass of trees in the south and west quarters, the site was not very promising for an observatory of general capacity. After much examination, I

at last recommended that a transit room should be built at the south-east angle of the mansion, where a meridian could be commanded at all times, from the lower passage of Capella on the north, to the southing of Fomalhaut: and in this I proposed that the moon and moon-culminating stars should be observed as regularly as circumstances would admit of, by means of a well-mounted five-foot transit telescope, albeit, but for such an exigence, I am averse to seeing so large a meridian instrument in the hands of an amateur.

The next point was, so to apportion the new structure that it should deform the aspect of the mansion as little as possible: on communicating my anxiety on this point to my friend Mr. Bevan, of Leighton Buzzard, he declared that it would never look half so ugly as the green-houses he had seen against some of our best mansions; "and, after all," added he, "who would listen to any one who could dare to decry building an observatory?"*

Early in 1831, I opened the trenches by drawing a meridian-line: my data were equal altitudes of the sun, taken with a well-adjusted reflecting-circle by Troughton, and an artificial horizon, and there was also the time by the portable transit. From this we raised perpendiculars to strike the angles of the south-east corner of the library wall, and, having stumped out the dimensions, dug down to the "live" rock for placing the foundation upon. As we had but the single instrument in view, I was resolved that it should experience no derangement or tremors for want of solid supports, and therefore had a large mass of the best marle bricks joined with cement raised for placing the piers upon, with a good space between it and the walls for ventilation; every care being taken to guard against damp, and a capacious dry drain laid around the building. The stone piers, each six feet high and cut from a single block of Portland stone, were then erected, and the flooring was carried so as not to touch them. This is the cross-section, from north to south:—

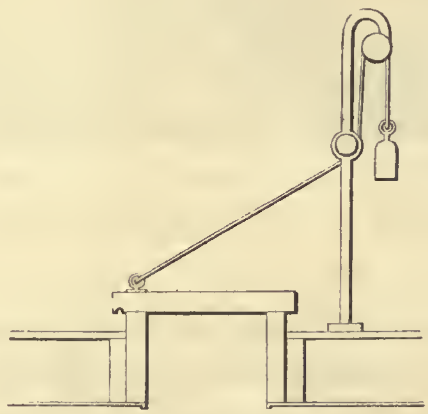
* Poor B. Bevan, C.E. died on the 1st of July, 1833. The night of the lunar eclipse was his last: he rose from his bed and observed the commencement, but expired during the progress of the phenomenon.



Indeed I must confess that there was no sparing of materials in the construction, for, though the transit-room is only eighteen feet by twelve—sixteen feet in height outside and ten feet five inches inside—with an ante-room of eight feet and a half, there were nearly twenty thousand bricks used, reckoning four thousand five hundred to each rod of work. The flooring was laid to a level with that of the inner apartments of the house, and, the wall under the south-east intervening window being cut away, the observatory and library became as it were, incorporated. The ante-room is fitted for the keeping and trimming of lamps; and a flight of steps leads to its flat and well-leaded roof, on which a five-foot achromatic may be occasionally used.

From the form of the eastern portion of its wall, and the interior lockers fitted on the west, the transit-room is octangular in shape, with its centre cut by the north and south windows and the *chax* or slit through the roof from the north to the south horizontal points. I had made arrangements for the shutter which closes this, being counterpoised with weights, as in my own at Bedford; but I one day found that a person had suggested lifting it by a crane-necked

contrivance which I never could approve of, although good John May, formerly an armourer in the navy, had made it of most unexceptionable materials and workmanship. I submit a representation of it as a warning, because what is termed at sea an "Irish purchase" is shown by the position of the central pulley; had it been a little lower, the cosine of the cord between it and the shutter would nearly have assumed the maximum state of helplessness. Even now, its chief action is that of battering the roof and shaking the ceiling.



During the time this room was under construction, Mr. Thomas Jones, of Charing Cross, was employed in getting the transit instrument ready, under my immediate inspection; and, as simplicity with capability for duty forms a very considerable point with me, in all mechanism, and the workmanship was limited to only what was necessary, it was soon completed. The telescope has an aperture of three inches and three quarters, and is sixty inches in focal length, two reading circles divided on silver and furnished with clamps and tangent-screws, with a full battery of eye-pieces, sliding plates for them, and rack-work motion to moderate the lighting-up of the lines within the telescope. It is borne at the centre by two well-proportioned cones, having a circumference of twenty-five inches at the telescope, which terminate in rigorously turned pivots of bell-metal of one inch and a quarter in diameter:

Plate XI.

Engraved by J. Basire.

The Hartwell Transit Room.

one of these is perforated and fitted with a lens, to communicate the light from a lamp upon the pier to the inner illuminating reflector, and from thence to the spider-lines, or wires, at the eye-end. These pivots, which are thirty inches apart, rest upon Y's, also of bell-metal; but, whether wisely or not may be questioned, the latter are additionally hardened by the introduction of a thin slice of Brazil pebble; the bearing of which is to the whole length of the pivot-cylinder. A well-constructed sensitive riding-level is placed over the cones when required, and stands upon both pivots; its glass tube is supported by the middle, and not by the ends, and it is furnished with a cross level and screw-adjustments, with counterpoise weight, for levelling it at right angles to the main axis. The instrument is exactly on the plan of that which I had made for myself, and mounted at Bedford, as described in my Celestial Cycle, vol. i. p. 329, from which it only differs in focal length, and a little in aperture. *(See plate XI.)*

Meantime Mr. B. L. Vulliamy, of Pall Mall, had undertaken to make a clock for the transit room, and a better train of wheel-work cannot be turned out of hand; but the beat is certainly inferior to that of Hardy's escapement. The frame is a particularly strong one, and all the parts are screwed together. The wheels and pinions are cut in very high numbers, which renders the action of the wheel-teeth in the pinions extremely smooth; and the combination is such, that it seems to have all possible means to overcome its own friction. The escapement is Graham's dead-beat, with steel pallets mounted in a brass frame: and it will be recollected that the preference for this form arises from the dead-beat being so true, that no variation in the clock-train is likely to have effect upon the time of oscillation of the pendulum, even though it may alter the extent of it on the arc of vibration. The pallets are portions of a ring, and the fittings of the arms that carry them are entirely formed by turning. There is an adjustment to the pallets to open and close them, so that the teeth of the wheel shall fall safe on the rest of the pallet, and no more. The pivot holes are all made of fine pan brass, mounted in a setting, and the end-shake determined by regulating screws. The pendulum is suspended

upon an independent support, entirely detached from the clock, the sole connexion between which and the pendulum is through the medium of the crutch, and consists of two adjusting screws. The clock was brought to Hartwell, and singularly well fixed, on November 14th, 1832; and by the side of its solid mahogany case two upright carriages and plates arise, in order to support two large brass brackets and stands, on which the lamps are placed for illuminating the clock's face.

As I had used a pendulum contrived by Mr. Jones, of Charing Cross, and considered that it obviated certain faults in the usual stirrup-support of a mercurial cylinder, I suggested that Dr. Lee's clock should be fitted with one. Mr. Vulliamy's assent was thus expressed to me, in a letter, dated June 27th, 1831:—

"I am much flattered by the confidence Dr. Lee reposes in me, and will spare no pains to make such a clock as shall give him perfect satisfaction: at least as far as is in my power.

"With regard to the pendulum, after what you have said, I will with much pleasure make it as you require; but I must claim from you the promise which you made me when I saw your clock at Bedford, of obtaining from Mr. Jones the mode of applying the brass case or covering to the steel rod.

"You must excuse my making a positive promise as to when the clock shall be done. I depend a good deal upon others as well as upon myself, and with the best intentions I frequently am lamentably deceived as to the time in which I can execute a piece of work. In this case, I feel I am under an obligation to you as well as to Dr. Lee to get the clock done as soon as practicable, consistent with its being well done, and you may rely upon my so doing.

"What chance is there of my father's fine clock being admitted into your Observatory? I have an idea it would perform uncommonly well."

The pendulum thus alluded to, is still in high favour with me after more than twenty years' acquaintance with it, and is therefore entitled to especial mention. The very simple and effective adaptation consists of a round steel rod, long enough to pass through the mercury, and nearly to the bottom of the inside of the cylinder containing it. The suspension-piece at the top of the rod is a bit of watch-spring, in the usual way: but the lower end of the rod has a screw on it about two inches long, the threads of which are each equal to

one-thirtieth of an inch. This screw works into an appropriate piece fixed to the metal bottom of the cylinder's interior, thereby allowing sufficient adjustment, according as we would compensate for mean or sidereal time: and the inside of this recipient is carefully and well coated with cement and gum lac, so that the quicksilver can never come in contact with the brass surface. The steel rod is covered loosely with a thin brass tube, which is pinned to its upper end, and passes below to the top of the cylinder, over which is a brass cover with a slit at its side, embracing a pin which projects from the cylinder's outer surface. The broad edge of the cap is engraved and divided into one hundred and twenty parts; and, as the pendulum-screw has thirty threads in the inch, it is evident that the unit of the scale by which the cylinder with its mercury may be raised or lowered, is the $\frac{1}{3600}$ of an inch. A steel point for marking the arc of vibration, is fixed on the bottom of the cylinder; and there are screws for the necessary adjustments.

As the excellence of the mercurial pendulum depends on the relative action of the steel rod and the quicksilver, it is evident in this instrument that they are in constant communication with each other, for full six inches of the rod is always immersed in the mercury; which is not the case in the usual construction, where they are never in contact. Moreover, both the rod and the mercury are covered with the same material, which gives them a fair chance of acting together; whereas in the stirrup-construction, the quicksilver is contained in a glass vessel—a bad conductor of temperature—while the rod is naked and exposed to the air. Hence the rod may undergo many changes of heat and cold that the mercury is defended from; and the additional hamper which the old construction requires, must occasion a greater drag, however difficult it may be to appreciate such an effect.

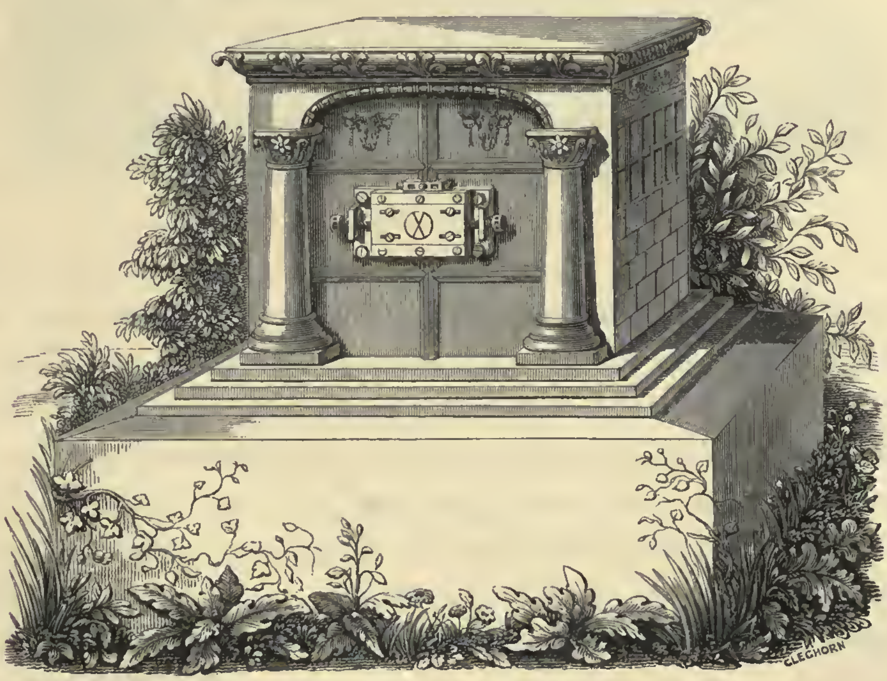
Another point in which I have been rather nice in a clock's performance is the weight, which is often sufficiently rude to wear the pallets and endanger the pendulum spring. I therefore directed one to be made in divers cylindrical pieces, like my own, so as to be capable of being adjusted to any weight between four pounds and nine pounds, within one quarter of an ounce. If a

pendulum vibrates two degrees on each side of the zero point of the arc, that marks as much weight probably as ought to be employed permanently: at the same time there is no objection to increasing the arc of vibration, by increasing the maintaining power to a certain extent. In the Hartwell clock I found that, with seven pounds one ounce, the pendulum vibrated one degree fifty-four minutes on each side of 0, a range to which it has been confined.*

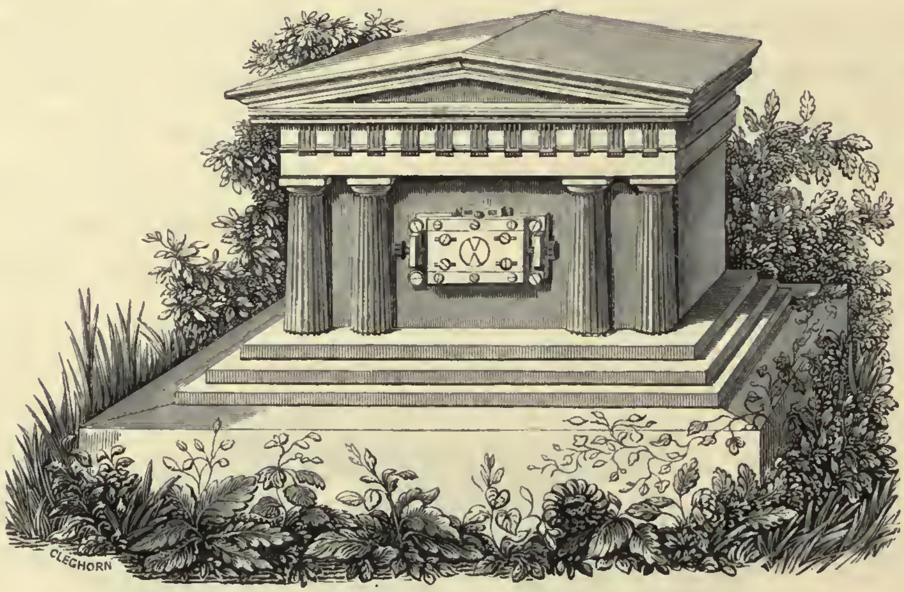
Much of this will be sufficiently trite to the magnates of practical science; but that is not altogether the class to whom these remarks are addressed, and fortunately it was never intended that the world should be peopled only with giants. Leaving the leaders, therefore, to their experience, knowledge, and plenitude of power in the great observatories, we are here only bent upon shewing any tyro, how he may enjoy the glorious heavens without bewildering himself in severe mental and mechanical drudgery, and meet the smiles of Urania without apprehension of encountering her frowns. It is therefore quite in place here, to insist on the advantages which a private establishment of this nature obtains from deducing a due registry of time; and to point out that the keeping an accurate clock-rate, is one of the neatest works of a good observer. The machines are, to be sure, so admirably constructed now-a-days, that little irregularity in the march need be dreaded in an interval of two or three days: but such are the imperceptible affections of escapement and pendulum, train and its drivers, in impulse and momentum, that no really zealous star-gazer ought to leave their errors so long unascertained. Where occasional absence or bad weather interpose and prevent a due examination, then the goodness of the clock must be relied upon; and it is on this account that every practical man should be provided with mechanism capable of such good performance as to aim at excellence. Constructive ingenuity has certainly advanced so near to perfection, humanly speaking, in this art, that a clock merely requires to be well treated and looked to, and it will render the most satisfactory results.

* It may be as well to advise those who dabble with the weights, to stop the clock on such occasions; as the pendulum should not on any account be suffered to vibrate when not under the influence of the maintaining power.

The clock being fixed, and the transit instrument rigorously drawn into the meridian by reference to the pole and circum-polar stars, it became necessary to establish permanent points of reference, by which not only the meridian, but other adjustments also, might be tested from time to time; and, as distant objects cannot always be seen in the day, and are precluded at night, I determined upon strengthening Dr. Lee's means by two of the meridian marks, of which I had found one so useful at Bedford (See Astronomical Society's Memoirs, vol. iv. p. 548). To mount these with a propriety due to the site, we had them inserted into blocks of marble cut at Bedford, from drawings made by Mrs. Smyth. The north mark is a representation of the Temple of Janus, as given on a large-brass medal of Nero inscribed, PACE POPULO ROMANO TERRA MARIQUE PARTA JANUM CLUSIT. See my Descriptive Catalogue of a Cabinet of Roman Imperial Medals, printed at Bedford in 1834, page 43; for the coin there described, Number 50, is that from which the temple is copied :—



The theory of this meridian appliance was, as I have elsewhere mentioned, suggested to me by Baron de Zach, when we were journeying together from Genoa to Bologna, there to catch the solar eclipse of September 1820 annularly. The south mark is exactly the same as the north one,—but it is mounted on a miniature of the façade of the Temple of Concord at Girgenti, with its central columns omitted, for the insertion of the meridian plate :—



In order to suffer as little alteration as possible from corpuscular or other action, these marble temples were placed on stout basement stones upon a solid brick-work foundation, which last was, for the same reason, carried no higher than was absolutely necessary. They were placed respectively at the distance of one hundred feet north and south of the observatory slit; and the reference was by means of two lenses, one in each window-sill, ground to one hundred feet focus, and mounted in brass frames, with tubes through the walls. The marks could of course be readily shewn, at any hour of the night, by the hand-lamps and a simple tin reflector.

It happened that while these arrangements were in hand, Mr. Davies Gilbert, late President of the Royal Society, came on a visit to Bedford, and was persuaded to accompany me to Hartwell, and inspect the new observatory. On being shewn the transit instrument, and acquainted with the end proposed, he warmly approved of the intention: "for," said he, "it may be very unexpectedly useful, as stars may be taken here when the sky shall be obscured at the regular observatories. And how curious it will be if a place in Kamschatka, or China, or other distant region, should have its longitude determined some day or other from Hartwell!" Since this remark was uttered, Dr. Lee's records have been ransacked on several occasions, for he is disposed to attend to every proper application which is made to him. But perhaps the nearest fulfilment of the Gilbert prediction was, when the worthy and hard-working Captain Philip Parker King, R.N. of New South Wales, who was a visitor at Hartwell in August 1849, found eight moon-culminating stars—corresponding to those he had observed in Australia in the years 1845, 6, and 7,—which he had in vain endeavoured to obtain elsewhere.

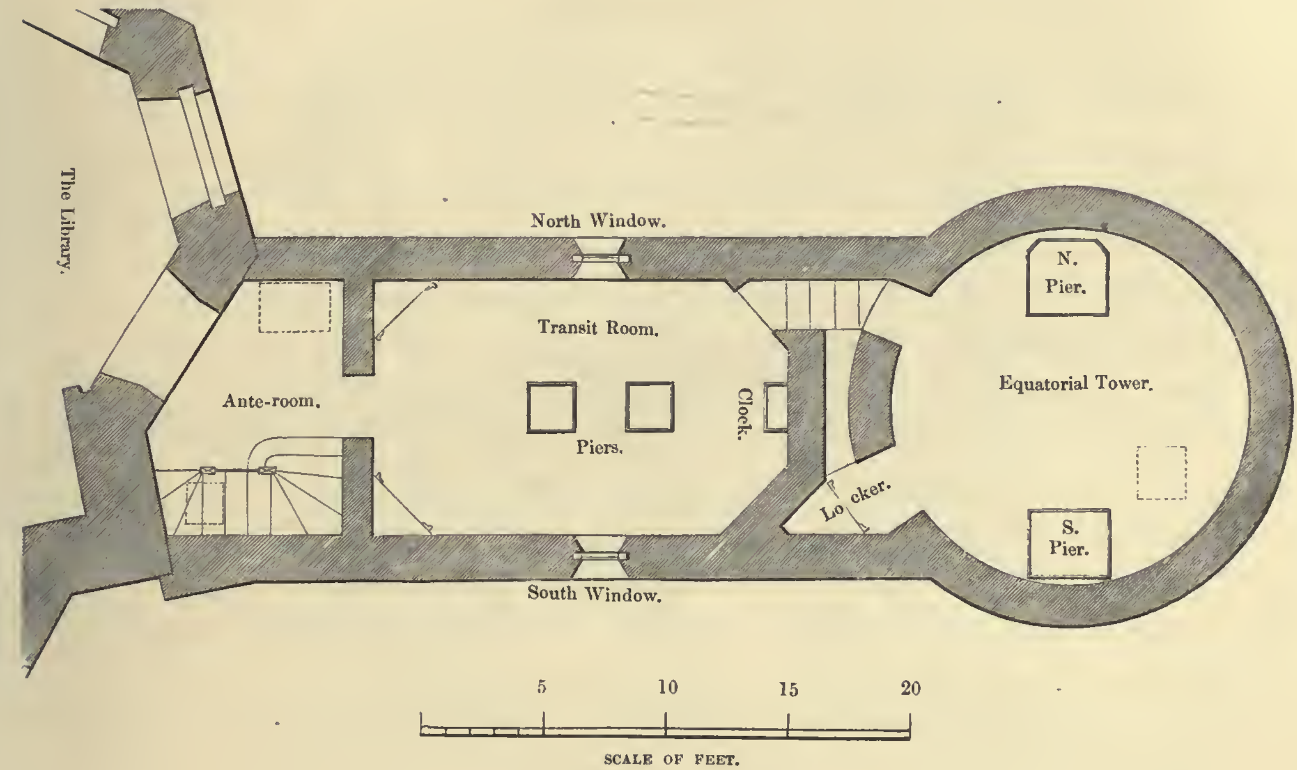
In this recollection, I am not insisting on the merits of moon-culminating stars beyond values that are recognisable. They are by no means adapted for determinating small differences of longitude with precision; for which nothing under one hundred complete sets, namely, fifty of each limb of the moon, should be attempted. With a fixed transit instrument, the Greenwich clock-stars may be used as culminators, though they are not, as with the selected stars, equally above and below the moon; and in all cases of small arcs, a single journey with a batch of chronometers will yield the longitude better than one hundred transits of the moon, which would occupy perhaps a couple of years, besides being attended with great trouble of computation. The longitude from one lunar culmination, is not unfrequently twenty-five seconds of time wrong. But, with all the possible imperfections on their head, my reason for recommending the consecutive observations of them was on account of there having been, about that time, a kind of conventional adoption of them in the observatories of Europe.

Although Mr. Maclear—the present distinguished Astronomer-Royal of the Cape of Good Hope—and myself, got a good arc between Biggleswade and Bedford by their means, as shewn in the Memoirs of the Royal Astronomical Society, vol. iv. p. 564, still, on several computations, I found that the results for such small differences would inevitably be anomalous. But this does not apply to larger arcs: there, while other methods might err greatly, or be seldom available, the moon-culminators are not affected with greater errors and uncertainties than in the small distances. Yet in all cases demanding implicit faith, a large number of well-taken observations of both limbs must be accumulated.

§ 3. THE EQUATORIAL TOWER.

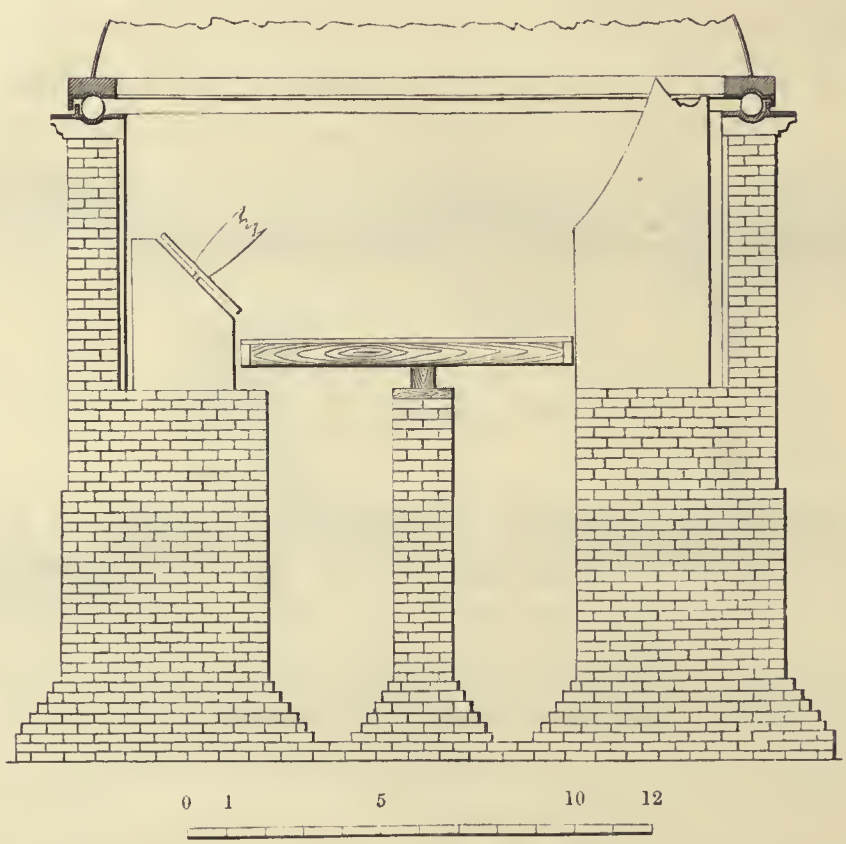
Although contentment is a virtue much vaunted in morals, it has not acquired great esteem in the sciences: nor was it more than three years after building his transit-room, and furnishing himself with a beautiful five-foot telescope, that Dr. Lee compassed the enlargement of his astronomical means, by purchasing a splendid object-glass, of five inches and eight-tenths in diameter. On his making this acquisition, I was again consulted as to adding an equatorial tower to the meridian observatory. I had, to be sure, sundry scruples on the occasion, inasmuch as the site, though very excellent for a meridian instrument, was extremely inapplicable for one which would be expected to sweep around: and I moreover maintained that the five-foot achromatic was fully equal to occultations, eclipses, and all the extra-meridional requirements of the place. However, after a reasonable time, I withdrew my opposition, and considered the conditions of the problem with attention. In the first place the new object-glass, which had nothing but its brass cell, was carried to Mr. Dollond, with a view to its being armed with eye-pieces, and mounted precisely in the manner of mine at Bedford. We then took

steps for fitting the tower symmetrically to the observatory, so as to form, as it were, a part of the original plan: the success of this is shewn by the lines of the whole building, as they stand at present:—



When the addition was thus carried in our synod, I called in the aid of my zealous friend Mr. Charles May, then of Ampthill, but now of the well-known house of Ransome and May, of Ipswich, under whose admirable arrangement the undertaking was finished. Determined that the foundation should be equally as stable for its purpose as is that of the transit, we again called sifted Roman cement and the very best brick-work into requisition; and the structure quickly assumed an important appearance. Besides the north and south piers for the supports of the polar-axis, a smaller one was run up in the centre, as there was a suggestion for using a smaller instrument there

occasionally; and the bottom part of the pier-chamber was well floored with brick laid in cement, by which means the damp liable to arise from the ground is interrupted. And the following is a section through the structure, in a north and south line:—



This tower has an interior diameter of fifteen feet, between walls which are fourteen inches thick in brick-work, capped with a Portland-stone coping in sixteen stout blocks, for bearing the iron channel and curb for the rollers on which the hemispherical dome, rising ten feet higher, turns. By the coping projecting outwards, it forms at once a moulding and, by a groove on the upper side, a channel for the rain to pass off without running down the wall. A cast-iron ring, made also in sixteen pieces, rests upon and is partially imbedded in this capping; the joints are made true, so as practically to be like a single

casting. In this is a shallow circular groove four inches and a half wide by three-quarters of an inch deep, and of the curvature due to a radius of four inches, in which three iron balls of six inches and a quarter diameter are placed, for the dome to run upon. The dome, in form, is almost a hemisphere, and is constructed of fir-wood in several thicknesses—each piece about six inches deep by eight inches and a half in width—the inner diameter of the dome being fifteen feet four inches. To the underside of the aforesaid curb is secured a ring of cast iron with a circular channel, being the counter-part of that just mentioned. From the upper side of this curb spring sixteen curved rafters of cast iron, the section of which is that of a ⊤, and the upper ends of these meet against a cast-iron ring of about three feet diameter: fifteen other intermediate rafters of similar section, but shorter, abut at their upper ends against cross-pieces connecting the fifteen main rafters, the sixteenth being left out to form a clear opening for view. The rafters are filled in between with two inches and a half battens, jointed straight, rabbeted in their length, and the ends meeting at the back of the rafters, where they are firmly screwed upon the back ribs of the same. The inside of each piece of wood being flat, the whole interior is, of course, polygonal; but the outside is adzed off to the proper curve, which is covered with thin copper sheathing. The opening for observation is continued to the upper ring, and is equal to one-sixteenth of the circumference: the shutter moves on a pin at the apex of the dome as a centre, and it is carried at the bottom by rollers on a bar fixed to the wood curb; there is also a toothed rack and pinion with a handle inside the dome, to give it motion. The shutter itself is in one piece of hammered copper, less than one-eighth of an inch thick, and it has a ridge on each edge to stiffen it, and act as a defence against rain driving in.

I have been the more particular in describing this, not only on account of the great comfort I have experienced under it, but also because the Hartwell Dome may very fairly be termed the first development of that latent talent for observatory engineering in Mr. May, which has since been so unequivocally manifested in various undertakings for the Astronomer Royal, Mr. Barclay,

himself, and others. When I planned my own revolving-roof at Bedford, economy led me to construct it of a straight-lined conic shape, instead of fashioning the ribs to a semi-circular bearing, as then generally obtained. But in this for Hartwell, where it was more imperatively necessary to consult appearances than with me, it was determined in conclave that it should be truly hemispherical, should move upon three balls, and should open by a single copper-shutter from the zenith to the wall-plate. And the present efficient and durable structure was the successful consequence, in which the roomy space, the strength, and the revolutionary principles are all equally admirable.

This is proved by the fact that, though the dome has been completed about fifteen years, it has never required repair or alteration, nor has the wet penetrated anywhere. None of the swags between the points of support formed by the three balls, which a weaker construction would have had to endure, have been known: and, from the firmness and accuracy of the wall-plate, these balls were found so little accelerated or retarded respectively that the roof was only lifted, for the first time since it was placed, on the morning of the 21st of September, 1850, there even then requiring but little adjustment. The mode of raising the roof a few tenths of an inch, just enough to release the balls whenever it is required to restore them to an equi-distant position from each other, is by a simple yet efficient contrivance of Mr. May's. It is by means of two stout little iron windlasses, unattached, and only used when necessary: they each consist of a pair of arched plates resembling the head of a large hammer, with a stout screw having a moveable capstan-head turned by a lever, thus affording great power of lifting in a compact form.

But while the tower was in full advance an unexpected interruption occurred, which temporarily gave the fine equatorial room to the five-foot achromatic telescope and its tripod stand. This was owing to Mr. Dollond's announcing that, on rigidly testing the large object-glass, he would not recommend it, as quite worthy of so expensive a mounting as had been proposed; and on our going to his house, the painful fact was proved. Still, though it did not attain the acme of excellence, it was so far good as to warrant

a proper apparatus; I therefore proposed a new and less responsible mode of calling it into action, which was about being adopted, when another circumstance changed its destiny. About the middle of the year 1836, I began to perceive that the object for which I had erected an observatory at Bedford had advanced to within a limited time of its proper accomplishment; and Dr. Lee, who had frequently made use of my great telescope, and was well acquainted with its high qualities, became a candidate for its possession when the materials for my intended astronomical work should be completed. This arrangement was the sooner made, because a future continuance of its use in prosecution of certain sidereal inquiries was most kindly and considerately conceded to me. When therefore my round of observations was complete, and affairs called me into Glamorganshire, my telescope was promoted from its humble location at Bedford to the splendid tower of Hartwell. This very fine instrument has been duly described, both in the Memoirs of the Royal Astronomical Society and in my Cycle of Celestial Objects; but the manner of my becoming possessed of the object-glass is best told in the words of Sir James South, who, in a letter to me from Camden Hill, of the 5th of October 1829, says—

> "I have brought with me from the continent a piece of flint-glass, upwards of twelve inches diameter, which I am going to have made into an object-glass. I recollect having promised you the refusal of my six-inch one, in case I resolved to part with it; such is now my intention. If therefore you are desirous of having it, pray let me know, as till I hear from you I shall not say anything about it to any one else. I do not mean to part with it for less than 220*l.* You will also remember that it has no stand, its clear aperture is 5·9 inches, its tube is of brass unpolished, it has a finder of large dimensions, is provided with illuminator and light-regulating apparatus, and has no eye-pieces. I *believe* it to be Tulley's *chef-d'œuvre;* of this however it becomes me to speak with caution, as the instrument is new. Admiral Rossel desires his regards to you and Mrs. Smyth, as does also Baron Zach."

A good six-inch object-glass was in 1829 almost unique; and as I had had an opportunity of testing the performance of the one in question at Mr. Tulley's, at Islington, I esteemed myself fortunate in securing the prize. The

mounting and equipment were instantly proceeded with; and, though science and practice have successfully laboured to improve equatorial movements since that time, I have every reason to be still satisfied with its simplicity, stability, and general performance. The principle is that of Mr. Jonathan Sisson's equatorial-sector, as described by Dr. Vince; in which an artificial polar-axis is placed parallel to that of the earth, with the hour-circle adjusted perpendicular to it, and a true collimation ensured. By thus obtaining a revolving axis in the same direction with the terrestrial one, the attached telescope readily follows any celestial body in its arc of revolution, without the trouble of repeated adjustments for the continual alterations of elevation, which attends all altitude and azimuth methods of mounting.*

Mr. Bishop's large telescope in Regent's Park, and Lord Wrottesley's in Staffordshire, are not only mounted on the same model, but are actually furnished with hour and declination circles cast from the moulds which were cut for me; and they differ so little in other dimensions that the three may almost be termed counterparts of each other, in a conventional point of view. As there is nothing like figures for nailing an assertion, the several sizes may be here shewn:—

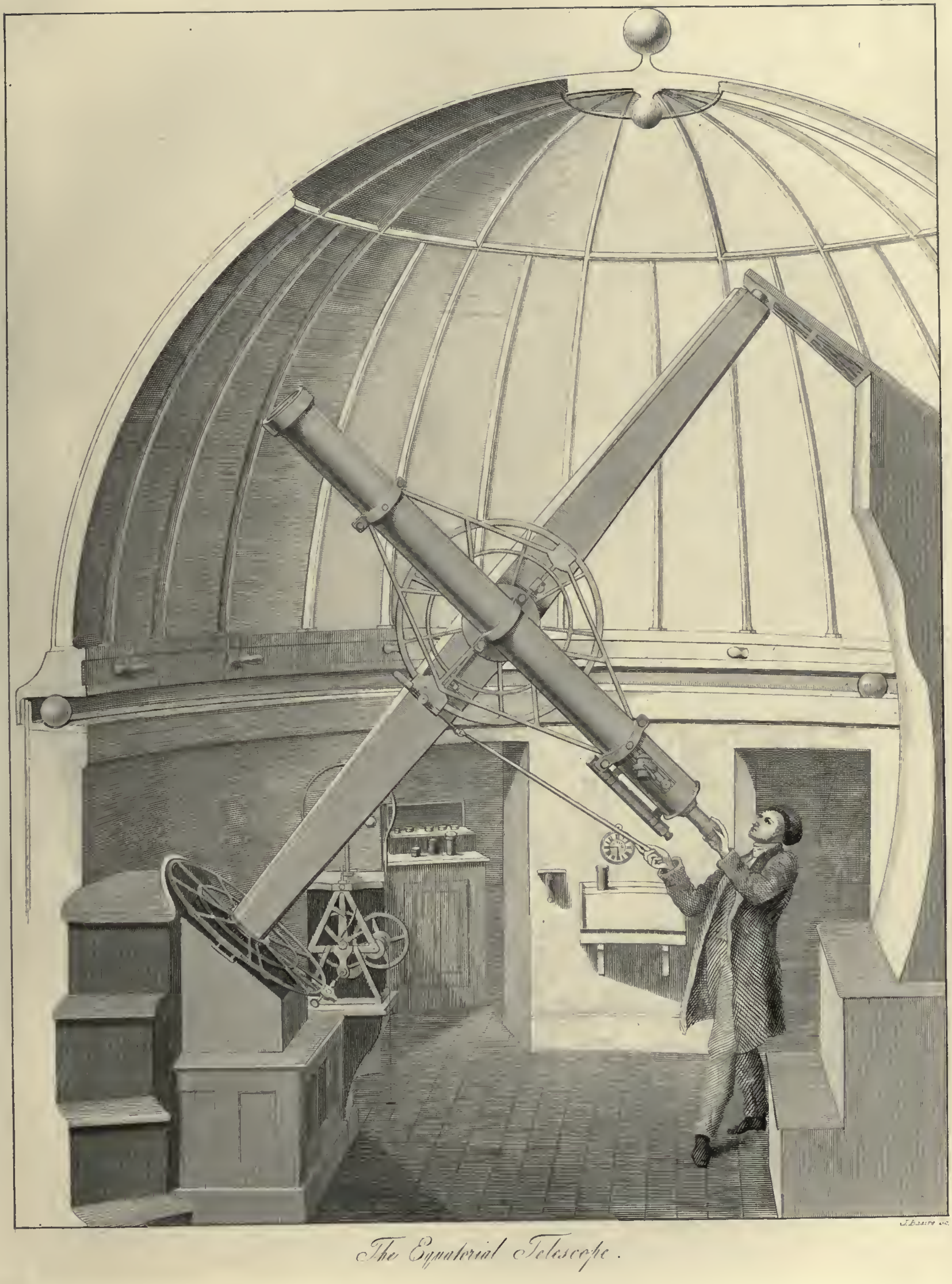
		inches.		ft.	in.
Mr. Bishop's . . .	*Aperture* .	7	*Focal length* .	10	2
Lord Wrottesley's	*do.*	$7\frac{3}{4}$	*do.*	10	9
Dr. Lee's	*do.*	5·9	*do.*	8	$8\frac{1}{2}$

The hour and declination circles of each, 3 feet in diameter.

Now the first of these instruments, in the hands of such adepts as Dawes and Hind, has fully proved the excellence and facility of its working, in measuring many of the closest double-stars in the heavens, in picking up new

* In usual parlance, this species of instrument has Sisson's name attached to it, because Dr. Maskelyne considered the one made for him by that workman, to be an improvement upon that made by Henry Hindley at York, in 1741. But a polar-axis, though without the appendage of graduated circles, was used by Christopher Scheiner so far back as the year 1620.

Plate XII.

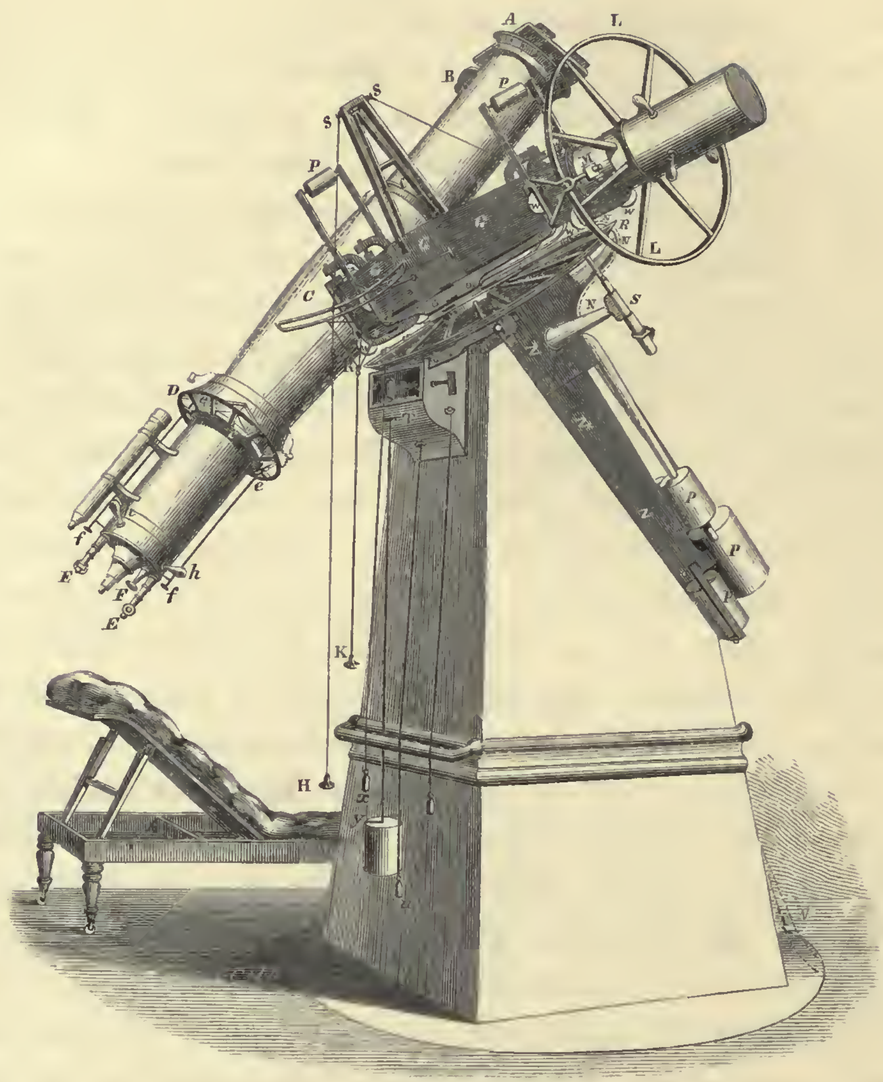


J. Basire sc.

The Equatorial Telescope.

comets, and in adding three planets to our system: and under the able treatment of Lord Wrottesley, the second has produced a systematic measurement of numerous double stars, undertaken for the express and difficult purpose of investigating the parallax of those awfully distant bodies.

For the benefit of enjoying an accurate opinion upon this matter, I have examined the telescopes of various observatories; and especially some of those which are termed German mountings, such as those of Mr. Dawes, Mr. Barclay, and Mr. Peters. But the strictest comparison I had was last spring in Oxford. It was on the occasion of my closing accounts with γ Virginis, after attending pretty closely to her for twenty years. Having completed my measures at Hartwell on the 17th of April, 1850, I immediately started off for the Radcliffe Observatory, and arrived in time to get some observations of the same star on the evening of the 18th, with the grand heliometer by the brothers Repsold, of Hamburgh, which had just been got into good action by my energetic friend, Mr. M. J. Johnson. This was a severe trial of the powers of the Hartwell telescope; for the heliometer is furnished with the best object-glass that Germany could furnish, and all the appliances attest the assiduity and care of Mertz and Sons. It certainly is a splendid instrument, with excellent optical definition, and is, no doubt, destined to render most important services to physical inquiry. Its object-glass is 7·5 inches in diameter, with a focal length of ten feet four inches: the scale is read by the illumination of a beautifully contrived application of Grove's galvanic heat upon a platinum wire; the appliances for manipulation are most conveniently arranged, and the clock-work driver of the hour-circle seems about as near to perfection as it need to be. But while thus rendering my meed of admiration to the Oxford heliometer, I must still repose with confidence in the goodness and trust-worthiness of the telescope I have so long and, as I trust, pretty successfully used. The difference of mounting between the two instruments will be instantly apparent to the most unpractised eye, by examining Plate IX. and the following representation of the heliometer, drawn by Mrs. Smyth—



A. Frame of the divided object-glass.

B. Microm. head of the external scale.

C. Cradle bearing the tube, which is turned by the handles *hh*, on the collars *cc*.

D. Position circle, whose slow motion depends on *ee*, while the clamp and tangent screws are *ff*.

E. Microm. microscopes for reading off the interior scale at the object end, illumined by galvanism.

F. Rod for separating the object-glass.

G. Iron box covering the declination axis.

WW. Friction rollers for relieving this axis.

H. Declination slow-motion handle, and *ss* its screws.

K. Rod for clamping the declination (the clamp itself is not seen).

LL. Declination circle.

M. One of the reading microscopes of ditto; the instrument is roughly set by the wooden handles.

NN. Part of the course of the galvanic communication.

PP. Counterpoises for the declination and AR axes.

RR. Hour circle.

S One of its microm. microscopes.

T. Clock for carrying the instrument.

t. Rod for setting the clock going.

u. Rod for regulating its rate.

x. Rod for connecting it with the hour circle.

y. Clock weight.

ZZZ. Box containing the polar axis.

To return to Hartwell. The equatorial-room is furnished with a chronometer compensated for sidereal time, and having a stop second-hand, with a leaping spring, for observing occultations and the like phenomena. There is also a simple and sonorous "journeyman," which was constructed for the late Colonel Beaufoy, and can readily be put in beat with the transit-clock when required. The telescope adjuncts—as eye-pieces, micrometers, shades, fog-tubes, &c.—are the same which have been already described. The equatorial clock-motion invented by the Rev. R. Sheepshanks, and presented to me by him, is also fixed in this tower, with its governor preventing the jerking or grinding, which a vibratory pendulum would inevitably occasion; for, as the force on the train increases the velocity of the balls of the governor, they fly further out, and thereby increase their moment of inertia or resistance to motion. Mr. Sheepshanks called the adaptation a "conical pendulum," because the rod of each ball describes a cone as it revolves: others designate it a "vertical pendulum,"—a case in which *utrum horum, &c.* is applicable.

§ 4. OF MR. EPPS'S MERIDIONAL OBSERVATIONS.

Towards the end of the year 1837, Dr. Lee engaged the late Mr. James Epps as his astronomical assistant at Hartwell. This gentleman had been for more than eight years the respected Assistant-Secretary to the Royal Astronomical Society, discharging his duties with uniform urbanity and intelligence; and, as he had for many years previously had charge of the chronometer-rating of a large marine establishment, he was considered to be fully qualified for carrying out the Doctor's wishes with regard to the moon-culminating stars. All the preliminary arrangements having been made, Mr. and Mrs. Epps were accommodated in Hartwell House from January, 1838, to the 10th of August, 1839, when he was suddenly taken ill, and died in his sixty-second year. He was buried in Hartwell Church, where Dr. Lee has placed an appropriate tablet with an inscription to his memory. It will therefore be seen that Mr.

Epps was but a short time in his new situation: he entered upon its duties with ardour, and had so far acquired the esteem and regard of his patron, that Dr. Lee generously assigned a liberal pension to the widow.*

The geographical position of an observatory is always a matter of some interest, although a rigidly accurate determination of the several co-ordinates may be actually necessary only in those public meridian establishments where the absolute place of the moon has to be fixed. But, in compliance with the general rule, I had made a few observations for an approximate latitude and longitude so far back as April 1829; taking the altitudes of the Sun, Procyon, and Regulus with a rickety reflecting circle and an artificial horizon for the first, and establishing the second by two trips with a pocket-chronometer from my clock at Bedford. These were the results—

Latitude		51°	48′	35″·6	north.
Longitude	in arc . .		50	03	west.
	in time .		3^m	$20^s·2$	+

Being satisfied that these conclusions would meet the existing wants, I rested on my oars; and in correcting any given quantity of time from the ephemeris, I usually applied one-eighteenth of an hour west of Greenwich as suitable to Hartwell, and as sufficiently near for all probable exigencies.† But when there was to be a regular observer employed, I suggested that a strong *fasciculus* of moon-culminators should be at once begun, for the twofold purpose of settling the longitude at home, as well as of aiding others abroad. This was complied with, though not carried to the required extent: yet a paper was drawn up and read to the Royal Astronomical Society in 1839, which, having taken place

* In January, 1845, Mr. John Glaisher, brother of the well-known Assistant Astronomer at Greenwich, was partly engaged to continue the Hartwell observations: he had just entered upon the regular routine, when he was most unexpectedly attacked with illness, and died, at the early age of twenty-seven years, on the 16th of May, 1846. He had received his induction under Professor Challis, at the Cambridge observatory. His registered operations still await arrangement and reduction.

† In the folio volume published by Adams in 1700, intituled "Index Villaris," the position of Hartwell House is placed in latitude 51° 49′ north, and longitude 0° 47′ west of London.

while I was in South Wales, I did not happen to see the document. I understand, however, that it is somewhat anomalous in some of the clock-rate and azimuthal details, which probably require a further sifting. Still, most of the observations might, even in their present garb, be useful in a further series that may yet be made at Hartwell; for in those which Mr. Epps took for time, every attention was paid to the state of the instrument, namely, that it worked with no apparent error in collimation, and very little in level, but correcting for its azimuthal deviation as occasion might require. Except therefore the unavoidable errors of observation, and some trifling optical defects, it was concluded that nothing of importance could be urged against the mean of all the results.

Meantime Dr. Lee had a very long meridian-line taken and measured, which revived the question. This line commences near the wind-mill on Bledlow Ridge, runs due north through the transit-instrument at Hartwell, and trends onwards to Scots' Hill, near the ancient camp at Whitchurch. The whole is a length of about twelve miles *(see plate I.)*, and a stout pole of forty feet in height was erected at each extreme: it was considered that from these stations, when their bearing and distance should be more accurately determined, the observatories of Oxford, Hartwell, Bedford, and Cambridge, might be geodesically connected, and afterwards carried from thence to Greenwich, the intellectual starting-point of the empire. It so happened that in the summer of 1842, my son Henry Augustus, of the Royal Artillery, then a cadet in the Military Academy at Woolwich, accompanied me to Hartwell, whither I was repairing to re-measure some sidereal objects. On this occasion, the weather being very fine and having some leisure time, we made a correcting survey of the Hartwell grounds, and re-examined the long meridian-line. This was an opportune lesson for the youth; for, though the theory of surveying is tolerably attained at the Academy, still there are many little matters of application and instrumental adjustment, which are perhaps only obtainable in actual practice. It was therefore merely a renewal of old

habits in which I had formerly indulged to a considerable degree, and a light course of field-performance for my son.

It now struck me that as good a longitude for the Observatory as need be required, would be obtained by attaching it trigonometrically to Aylesbury Church-spire, the position of which in the great Trigonometrical Survey, as re-computed by Captain Yolland of the Royal Engineers from the original data, is—

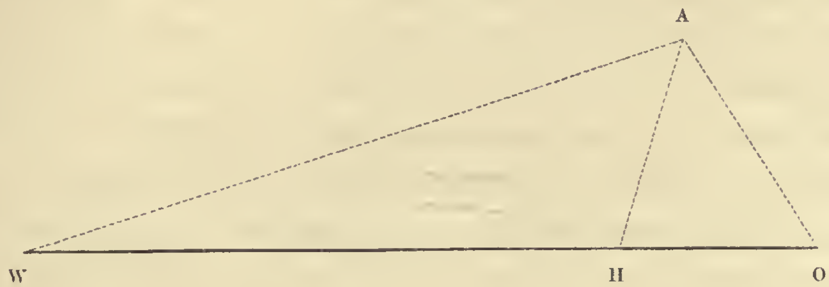
Latitude		51°	49′	1	·00	north.
Longitude	arc	0	48	50	·15	west.
	time		3^m	15^s·34.		

In the first place, we carefully took the angles subtended between the principal objects of triangulation and the Whitchurch meridian-pole, with the seven-inch theodolite—carefully adjusted—standing on the transit-roof, and plumbing the centre of that instrument. The mean of the readings thus obtained were—

Aylesbury Church-spire	55°	35′	00″.
Ashridge Column	88	38	40.

Joined by Mr. Akehurst, who had made the first measurements, and Mr. William Blake, we then went to the north meridian-pole, where we had good and distinct vision of all the necessary points, even to Bledlow Ridge, had we wanted them. The distance from the Observatory to the pole, as ascertained by Mr. Akehurst, is forty thousand two hundred and fifty-six links (0·66 to a foot); but I found it necessary, for the sake of commanding the angle, to measure back one hundred and fifty-six links on the meridian-line. My station was therefore forty thousand one hundred links from the Hartwell instrument, where I found the angle between the latter and Aylesbury spire was exactly 17° 31′; and from Haydon Hill, ten thousand one hundred and

forty-eight links from the Observatory on the same line, the angle was 73° 50′. The question now was simply



W, H, and O, being the base-line running from Whitchurch pole, through the Haydon Hill station, to the Observatory; and the apex is Aylesbury spire. We then have—

Sin. WAO : sin. AWO :: WO : AO =4·1008594 or 12614·2 links.
Sin. WAO : sin. AOW :: WO : WA=4·5387443 or 34573·6 links.
Sin. AHO : sin AOH :: AO : AH=4·0348092 or 10834·5 links.

With these data, and assuming that in this latitude 62·83 feet are equal to a second in space, it follows that the longitude of the Hartwell Observatory may be very safely regarded as in longitude 50′ 39″·46 west of Greenwich, or + 3^{m} 22^{s}·63 difference of time: and the latitude yielded by this method, is 51° 48′ 14″·58 north. There is a vague rumour that General Roy's data for the position of Aylesbury spire require correction: when this shall have been ascertained and reduced to a fact, there is no doubt but the corrective quantity will follow the inquiry, and be duly applied; then the same amount may be added to or subtracted from the ordinate for Hartwell. But until such an operation has been earnestly undertaken and satisfactorily performed, the trigonometrical longitude here given will answer every possible purpose, although mundane sphericity was not considered in the above computation.

To revert for a moment to the process by means of moon-culminating stars, I ought to have mentioned, that the vicinity of Hartwell is very strong

in meridian means for attacking the problem, there now being no fewer than three other meridian batteries in immediate connection. The first of these is an excellent and efficient private observatory, erected by the Rev. J. B. Reade at Stone, and fitted with a fine transit-instrument on well-placed solid piers; and whose equatorial telescope is worked under my original Bedford revolving dome. The second is a neat transit-room built by the Rev. Charles Lowndes, at the Hartwell Rectory; it is furnished with a transit-telescope of 4·2 inches aperture, and six feet focal length, accompanied by a capital clock of Dent's. The third is a smaller one in Aylesbury, equipped by Mr. Thomas Dell. The last is well worthy of note, because it evinces the successful pursuit of practical astronomy under forbidding difficulties. Of less pretension than its costly neighbours, this Uranian room is but seven feet in length, five feet and a half wide, and six feet and a half high. It is constructed in the corner of a court-yard devoted to far different business, the turmoil of which has not prevented some excellent observations being made and recorded. By placing the pier for his thirty-inch transit and meridian-slit a good deal on one side of the room, Mr. Dell has contrived space for his clock and a writing-desk. The building is of wood, which, being screwed together, can be taken apart and set up again in a very short time, if necessary. The cost, including labour and materials, did not exceed six pounds.

The Hartwell transit-instrument is already described; but, although not exactly necessary, it might have been interesting to mention that it resulted from a family legacy. The following inscriptions are engraved, on circular silver plates, above and below the transit cone's centre—

This instrument was made by
Thomas Jones of Charing Cross, under the inspection of Capt. W. H. Smyth, R.N.
For the Transit Room at Hartwell, 1831.

Joanni Lee, LL.D.
Testamento Legavit Louisa Soror Carissima,
A.S. MDCCCXXXI.

Mr. Epps principally observed those objects which transited the meridian, as the moon, moon-culminating stars, and planets: but, having something to learn in using instruments of a larger size than he had been accustomed to, he can hardly be said to have fairly entered upon what was proposed to be his standard occupation. There are therefore some deficiencies and various awkwardnesses in his recorded observations, for which he could no doubt in some measure have accounted, had he lived to reduce them himself. Four or five years after his regretted death, all his rough registers were forwarded to me at Chelsea; and, having closely investigated the whole of them, I selected three hundred and fifteen of his stars, many observed with the moon, by which to test the resulting right-ascensions, as a proof of their trustworthiness in questions of longitude. From the very tenor of this inquiry, it was attended with no small drudgery, as many were called that were not ultimately chosen. Every effort, however, was made to secure as great a number of the transits as possible from oblivion; but, owing to the instrumental corrections not being always noted, even the apparent clock-error was on many days too wavering to be depended upon. In this "fix," probability has claimed its share of attention in selecting the Greenwich stars on which to append the corrections; and the squared sheets of paper mentioned in my Cycle (vol. i. page 429) were also called into requisition for describing the horological curve. In addition to which, a very efficient aid in these reductions was derived from computing a table of constants (sin. Z. D.—sin. P. D.) for every degree of polar distance, and applying the suitable correction to each star observed on that day; the azimuthal deviation constituting a most important element. In the following catalogue, the two Greenwich stars—high and low—selected for this object, are given in a column assigned for that purpose. The detail of one day's sifting compared with the orthodox work will, perhaps, be the best explanation of the adopted system; since it was a case to which the more regular process of reduction was not altogether applicable.

By arranging the transits of each day in the order of their N.P.D. the increase or decrease of the clock-error shewed the rough azimuth deviation of

the instrument; whilst the proportion applicable to each star was indicated by the table purposely prepared for the latitude of Hartwell.

Making due allowance for the lapse of time between the transits, and then applying it to the clock-errors, the difference between the high and low star is divided by the tabular azimuth difference between those two polar distances. The quotient thus obtained is multiplied by the tabular number, and the result is applied to the clock-error. Finally, the difference in this last column from the clock-error resulting from the selected index-stars, indicates the modification required in the place before assigned to the unknown star. For example—

1839. 2nd May.	Stars.	Approx. AR.	N.P.D.	Clock-error.	Diff. of AR.	Applied Clock-err.	Azimuth dev.	Applied Correction.	Corr. to star's place.	By usual method.	Azim. deviat. Table for Hartwell.
		h. m.	° ′	sec.	s.	sec.	s.	sec.	s.	s.	s.
comp.	δ Urs. Maj.	12, 07	32·02	+12·38	+0·19	12·57	−0·10	+12·47	+0·65	+0·71	−0·20
	γ Urs. Maj.	11, 45	35·25	+11·70	+0·17	11·87	−0·04	+11·83	+0·01	+0·04	−0·08
	α Can. Ven.	12, 49	50·49	+11·35	+0·22	11·57	+0·14	+11·71	−0·11	−0·03	+0·29
	Castor [2]	7, 24	57·46	+11·63	. .	11·63*	+0·19	+11·82	. .	−0·06	+0·40†
	Pollux	7, 36	61·35	+11·72	+0·0	11·72	+0·22	+11·94	+0·12	+0·11	+0·45
	β Leonis	11, 41	74·32	+11·32	+0·17	11·49	+0·30	+11·79	−0·03	+0·01	+0·62
comp.	π Virg.	11, 53	82·26	+10·98	+0·18	11·16	+0·34	+11·50	−0·32	−0·27	+0·70
	Procyon	7, 31	84·22	+10·99	. .	10·99	+0·35	+11·34	−0 48	−0·50	+0·72
comp.	γ Virg.	12, 33	90·30	+11·40	+0·21	11·61	−0·38	+11·99	+0·17	+0·26	+0·80
	β Corvi	12, 26	112·30	+11·12	+0·20	11·32	+0·50	+11·82	. .	+0·09	+1·05
					Castor	11·63*					·40†
						·31	dividend.				·65)·310(47·7
											·500
											·45

δ Urs. Maj. observed 12h 7m 40s·82

a	*b*	*c*	*d*
−9·0992	−7·5818	+0·4776	−9·0275
−1·1434	−1·1330	+9·5461	−0·9611
+0·2426	+8·7148	+0·0237	+9·9886

Nat. num. +*a* 1·748
b 0·052
c 1·055 } +3·828
d 0·973

A.S.C. 12h 6m 57s·58 prec. 3·003
27 ·03 9
3 ·83 27·027
7m 28·44
Observed 7m 40·82
Clock . +12·38

Rate by Procyon.

29 April	+14·20	·48	·48	·48	·48
2 May	+10·99	·2	·08	·3	·4
Lost in 72 hrs 3s·21 = ·04 per hr.		·096	·0384	·144	·192

Rate by Pollux.

29 April	+14·63	·48	·48	·48	·48
2 May	+11·72	·45	·6	·7	·8
Lost in 72 hrs 2s·91 = ·04 per hr.		·216	·288	·336	·384

π Virg. observed $11^h\ 52^m\ 50^s{\cdot}32$

a	*b*	*c*	*d*	A.S.C. $11^h\ 52^m\ 09^s{\cdot}61$	prec. 3·074	*Rate by Castor.*	
−8·8274	+7·3618	+0·4877	−7·9467	27·66	9	29 April +14·59	·48
−1·1434	−1·1330	+9·5461	−0·9611	2·07		2 May +11·63	1·05
					27·666		
+9·9708	−8·4948	+0·0338	+8·9078	39·34		Lost in 72 h^{rs} $2^s{\cdot}96$ = ·04 per h^r.	·240
				Observed 50·32			·480
				Clock +10·98			·5040

Nat. Num. +*a* 0·935	+2·096
c 1 080	*b* −0·031
d 0·081	+2·065

γ Virg. observed $12^h\ 33^m\ 43^s{\cdot}50$

a	*b*	*c*	*d*	A.S.C. $12^h\ 33^m\ 02^s{\cdot}79$	prec. 3·022
−8·8194	−7·9814	+0·4803	+6·7735	27·20	9
−1·1434	−1·1330	+9·5461	−0·9611	2·11	
					27·198
+9·9628	+9·1144	+0·0264	−7·7346	32·10	
				Observed 43·50	
				Clock +11·40	

+*a* 0·918	+2·110
b 0·130	*d* −0·005
c 1·062	+2·105

Examples of correcting AR. of unknown stars, by two Greenwich stars being assumed as known, α Cyg. and α² Capric.

Ex. I. γ Cygni gives clock-error too small; its assigned AR. being too small:—

4th July, 1839 . .	Computed . .	AR. $20^h\ 16^m\ 29^s{\cdot}23$
	Correction	+ ·64
		29·87
	Observed	27·60
	Clock slow	2·27
	Azimuth deviation . . .	− ·17
	The same as by *α* Cygni . .	−2·10

Ex. II. θ Aqui. gives clock-error too large; its assigned AR. being too large:—

4th July, 1839 . .	Computed . .	AR. $20^h\ 3^m\ 2^s{\cdot}72$
	Correction	− ·15
		3 02·57
	Observed	2 59·97
	Clock-error	−2·60
	Azimuth deviation . .	− ·50
	Agreeing with *α* Cygni .	−2·10

In the following Catalogue of the Hartwell Stars, the left-hand page contains the copy of Mr. Epps's registered observations, forming, as it were, the raw material of the right-hand or opposite page, where the results of reduction are given, and the difference of those results from the well-known Catalogue of the Royal Astronomical Society; the whole being brought up to the epoch 1850 by Mr. Baily's co-efficients. I have given weights, 0 to 3, on the ultimate determinations, as shewing the comparative value which an investigation of them produced.

OBSERVATIONS.

Date.	Star's name.	Telescope wires. I.	II.	Centre.	IV.	V.	Mean Transit.	Clock's Error.	Clock's Daily rate.	Remarks.
		secs.	secs.	h. m. s.	secs.	secs.	s.	s.	s.	
1838 3 Oct.	21 Andromedæ *N. A.* α	19·5	40·5	0 0 1·5	22·5	43·6	1·52	— 03·32	— 2·41	Rate with α Coron. 5 days before.
29 „	Ditto	21·0	42·0	0 0 3·3	24·2	45·4	3·18	— 01·63	— 2·08	Rate with ζ Aqui. 3 days before.
3 Oct.	88 Pegasi *N. A.* . . γ	15·2	34·4	0 4 53·8	13·0	32·2	53·72	— 03·77	— 2·38	Level W. + 0″·96. Rate with γ Aqui. 3 days before.
29 „	Ditto	16·9	36·0	0 4 55·2	14·4	33·6	55·22	— 02·26	— 2·29	Level next day E. + 0″·55. Rate with γ Aquilæ 3 days previous.
3 Oct.	8 Ceti *comp.* . . . . ι	31·9	50·8	0 11 09·9	28·8	47·7	9·82	— 03·86	— 2·34	Level on the 5th red. to W. + 0s·61. Rate by α^2 Capr. 9 days after.
29 „	Ditto	33·6	52·5	0 11 11·2	30·0	49·0	11·26	— 02·41	— 2·17	Rate with α Capric. 3 days previous.
3 Oct.	44 Piscium . . . t	28·0	46·6	0 17 05·2	23·8	42·5	05·22	— 03·84	— 2·19	Wrottesley corrects N.A. by + 0″·41. Rate with α^2 Capric. 6 days previous.
29 „	Ditto	29·8	48·5	0 17 07·0	25·6	44·0	6·98	— 02·51	— 2·21	Rate with α Capric. 3 days previous.
26 Nov.	Ditto	42·0	0·7	0 17 19·3	37·9	56·5	19·28	+ 10·35	— 0·79	Rate with α Aqua. 2 days previous.
26 Nov.	18 Cassiopeiæ *N. A.* . α	29·0	2·0	0 31 35·0	8·0	41·0	35·00	+ 10·39	— 1·06	Rate by γ Ursæ M., S. P. 2 days previous.
1839 17 April	Ditto S. P.	49·3	22·0	12 30 55·0	28·1	1·0	55 08	— 27·59	— 1·13	Rate with γ U. M. the previous day. Cloudy; mer. mark trem.
1838 26 Nov.	16 Ceti *N. A.* . . . β	1·5	21·1	0 35 40·7	0 2	19·8	40·66	+ 09·66	— 1·35	Rate with δ Capr. 2 days previous.
„	P. 189 Piscium A.S.C. 79	29·7	48·2	0 40 06·8	25·4	44·0	6·82	+ 12·08	— 0·16	Wrottesley corrects it by + 1s·85. Rate with ζ Peg. 2 days previous.
1 Nov.	5 Arietis *N. A.* . . . γ	55·4	15·0	1 44 34·6	54·2	13·9	34·62	— 08·26	0	Dble star, same AR.
1 Nov.	48 Arietis *comp.* . . ε	13·7	33·5	2 49 53·3	13·1	33·0	53·32	— 08·31	— 2·01	Rate by γ Peg. 3 days previous Az. er. by α Cap. and α Cyg + 1″ 28 and by α Ceti and α Pers. + 0·97.
27 Dec.	Ditto	49·4	9·1	2 50 29·0	48 9	8·9	29·06	+ 27·25	0	A good night's work. Clk. put forward to-day.
1 Nov.	92 Ceti *N. A.* . . . α	6·7	25·2	2 53 43·8	2·4	21·0	43·82	— 09·02	— 2·15	Rate with α Aqua. 3 days previous.
1 Nov.	Arietis . . . . δ	38·8	58·6	3 02 18·3	38·0	57·8	18·30	— 08·14	— 1·96	Rate with γ Peg. 3 days previous.
2 „	Ditto	36·8	56·4	3 02 16·0	35·8	55·5	16·10	— 10·36	— 2·02	Rate with γ Peg. 4 days previous. Level W. + 0″·25.
27 Dec.	Ditto	14·6	34·2	3 02 54·0	13·7	33·2	53·94	+ 27·24	0	The clock was put forward to-day .Az. E. + 0″·27 by α Aqui. and α Cyg. by Epps.

DEDUCTIONS.

Star's name.	AR. 1 Jan. 1850.	Approx. P.D.	Δ Ast. C.	Daily Azim. Dev. E.	Star's compared for daily azim.	Wt.	Az. correction.	Remarks.
	h. m. s.	° ′	s.	s.			s.	
21 Andromedæ . . α	00 37·93	61 45	+ 0·06	1.00	α Lyræ and mean	1	— 0·46	Level W. + 0″·96.
Ditto	„	„	— 0·73	1·28	α Cyg. and α² Capric.	2	— 0·58	Resumed eye-piece No. 3. Tolerable night.
88 Pegasi . . . . γ	0 05 30·86	75 39	— 0·21	1·00	α Lyr. and mean	1	— 0·63	Greenw. stars irregular.
Ditto	„	„	— 0·04	1·28	α Cyg. and α² Capric.	3	— 0·81	Encke's comet seen.
8 Ceti . . . . ι	0 11 46·78	99 39	— 0·02	1·00	α Lyr. and mean	1	— 0·90	Clouding over.
Ditto	„	„	+ 0·14	1·28	α Cyg. and α² Capric.	3	— 1·10	Level next day E + 0″·55
44 Piscium . . . ι	0 17 42·45	88 53	— 0·12	1·00	α Lyræ and mean	1	— 0·77	Results unsatisfactory.
Ditto	„	„	— 0·10	1·28	α Cyg. and α² Capric.	2	— 0·98	Resumed eye-piece No. 3.
Ditto	„	„	+ 0·13	0·31	γ Drac. and Fomal.	2	+ 0·23	Transits irregular.
18 Cassiopeiæ . . α	0 32 00·70	34 17	— 0·10	0·31	γ Drac. and Fomal.	3	— 0 04	Level W. + 0″·59.
Ditto S.P.	„	„	+ 0·23	0·50	γ Urs. M. and β Corvi	2	— 0·06	The lower passages are irregular.
16 Ceti . . . . β	0 36 03·19	108 49	— 0·47	0·31	γ Drac. and Fomal.	0	+ 0·32	Clear weather.
P. 189 Piscium A.S.C. 79	0 40 28·36	85 29	+ 1·85	0·31	γ Drac. and Fomal.	3	+ 0·22	The N.A. continued the error.
5 Arietis . . . γ	1 45 18·26	71 27	+ 0·56	1·35	α Pers. and α² Capric.	3	— 0·78	Too great an az. deviation. Epps gives two deviations for to-night.
48 Arietis . . . ε	2 50 38·32	69 16	+ 0·48	0·21	α Cyg. and α Aqui.	1	+ 0·11	A fine clear night.
Ditto	„	„	+ 0·62	1·35	α Pers. and α² Capric.	2	— 0·74	Some Greenwich stars irregular.
92 Ceti . . . . α	2 54 26·36	86 30	+ 0·20	1·35	α Pers. and α² Capric.	3	— 0·75	Variable night.
Arietis . . . . δ	3 03 03·19	70 51	+ 0·86	1·35	α Pers. and α² Capric.	0	— 0·77	Meridian position same as yesterday.
Ditto	„	„	+ 0·17	1·20	α Pers. and γ Erid.	2	— 0·68	Instrument steady.
Ditto	„	„	+ 0·49	0·21	α Cyg. and α Aqui.	3	+ 0·11	Therm. in clk. case 36°.

OBSERVATIONS.

Date.	Star's name.	Telescope wires.					Mean Transit.	Clock's		Remarks.
		I.	II.	Centre.	IV.	V.		Error.	Daily rate.	
		secs.	secs.	h. m. s.	secs.	secs.	s.	s.	s.	
1839 15 July	33 Persei *N. A.*, S. P. *a*	. .	21·5	15 12 50·0	18·5	47·0	50·00	— 02·96	0	Rev. axis, no er. in collim.
1838 28 Dec.	Pleiadum *b*, or 17 Tauri	6·8	27·0	3 35 47·2	7·5	27·7	47·24	+ 26·95	— 0·53	Rate with ε Arictis yesterday.
2 Nov.	25 Tauri . . . . η	5·6	25·8	3 37 46·0	6·3	26·5	46·04	— 09·96	— 1·93	Rate with γ Peg. 4 days previous.
27 Dec.	Ditto	43·2	3·6	3 38 23·9	44·0	4·3	23·80	+ 27·35	0	The clock was put forward to-day.
28 „	Ditto	42·7	2·8	3 38 23·0	43·3	3·6	23·08	+ 26·63	— 0·72	Rate by η Tau. the previous day.
1839 25 Feb.	34 Eridani . . . γ'	35·4	54·4	3 50 13·5	32·6	51·7	13·52	— 18·17	— 1·35	Rate with ε Can. M. 2 days previous.
1838 2 Nov.	Tauri *comp.* . . A'	21·5	41·4	3 55 01·4	21·2	41·5	1·40	— 10·21	— 1·90	Rate with ε Ariet. 1 day previous.
27 Dec.	Ditto	59·5	19·7	3 55 39·5	59·7	19·8	39·64	+ 27·48	0	Clock put on to-day.
28 „	Ditto	59·0	18·9	3 55 39·0	58·9	19·0	38·96	+ 26·80	— 0·68	Rate with itself yesterday.
1839 25 Feb.	14 Draconis *N.A.* S.P. η	13·2	52·8	4 21 32·2	11·8	51·0	32·20	— 17·70	— 1·27	Rate with η Drac. S. P. 8 days previous.
24 April	87 Tauri *N. A.* . . *a*	23·0	42·4	4 27 01·8	21·0	40·3	1·70	+ 20·36	0	Rate uncert. Axis reversed.
25 Feb.	Ditto	. .	. .	4 26 24·0	43·0	2·5	23·83	— 18·15	— 1·67	Rate with ε Gem. 2 days previous.
1838 28 Dec.	102 Tauri *comp.* . . ι	16·9	36·7	4 53 56·6	16·5	36·5	56·64	+ 26·70	— 0·65	Rate with η Tau. yesterday.
1839 24 April	13 Aurigæ *N. A.* . *a*	15·5	42·0	5 05 08·6	35·2	2·0	8·66	+ 20·50	0	Level W. + 0″·11. Revd axis on 22d instant.
24 April	19 Orionis *N. A.* . β	. .	49·3	5 07 08·2	27·2	46·0	8·23	+ 20·03	0	Stars tremulous. Axis revd. on 22d instant.
1838 7 May	112 Tauri *N. A.* . β	. .	58·7	5 16 19·9	40·8	2·0	19·80	+ 16·79	0	Axis reversed. Level W. + 0″·49.
28 Dec.	Ditto	53·0	14·0	5 16 35·0	56·0	17·2	35·04	+ 26·45	— 0·90	Rate with η Tau. yesterday.
2 Dec.	136 Tauri *comp.* . . C	32·8	53·7	5 43 14·8	35·7	56·7	14·74	+ 01·06	— 1·45	Level E. 0″·71. Rate with *a* Peg. 8 days previous.
2 Dec.	58 Orionis *N. A.* . *a*	51·1	10·0	5 46 28·7	47·3	6·2	28·66	+ 00·22	— 1·52	Rate with ζ Peg. 8 days previous. Star large. Level E. 0″·71
1839 24 April	Ditto	10·4	29·0	5 46 47·8	6·7	25·2	47·82	+ 20·11	0	Very trem. clock put forward.
1838 2 Dec.	13 Geminorum *N. A.* μ	34·7	54·7	6 13 14·9	34·9	54·9	14·82	+ 00·62	— 1·50	Stars difficult. Level E. + 0″·71. Rate with *a* Peg. 8 days previous.
1839 23 Feb.	27 Geminorum *comp.* ε	. .	27·8	6 34 48·2	8·8	29·3	48·25	— 14·81	— 1·79	Level W. + 0″·49. Rate with δ Gem. next day.
24 „	9 Canis Maj. *N. A.* *a*	8·8	28·2	6 37 47·5	7·0	26·3	47·56	— 16·79	— 1·32	Star bad fig. Rate by ε Can. M. previous day.

DEDUCTIONS.

Star's name.	AR. 1 Jan. 1850.	Approx. P.D.	Δ Ast. C.	Daily Azim. Dev. E.	Star's compared for daily Azim.	Wt.	Az. correction.	Remarks.
	h. m. s.	° ′	s.	s.			s.	
33 Persei S.P. . . . α	3 13 37·77	40 41	+0·66	0·49	γ Drac. and μ Sagitt.	0	−0·75	Transits irregular.
Pleiadum *b*, or 17 Tauri	3 35 58·27	66 20	+0·71	0·43	Capella and Rigel	0	+0·23	Level carefully taken W. +0″·47.
25 Tauri . . . . η	3 38 34·03	66 20	+0·54	1·20	α Pers. and γ Erid.	2	−0·61	Level nearly as yesterday.
Ditto	„	„	+0·61	0·21	α Cyg. and α Aqui.	2	+0·10	Clock vibrations down to 16·0.
Ditto	„	„	+0·38	0·43	Capella and Rigel	3	+0·22	Level W. +0″·47. Shutter open.
34 Eridani . . . γ	3 51 01·70	103 56	0	0 50	η Drac. S. P., and γ Erid.	0	−0·47	Merid. position steady.
Tauri . . . . A¹	3 55 49·48	68 20	+0·34	1·20	α Pers. and γ′ Erid.	3	−0·65	Level +0″·25. Epps' Az. dev.=1ˢ·23.
Ditto	„	„	+0·76	0·21	α Cyg. and α Aqui.	1	+0·11	A fine clear night. Thermometer 36°.
Ditto	„	„	+0·57	0·43	Capel. and Rigel	3	+0·24	Level W. +0″·47.
14 Draconis S. P. . η	4 21 57·32*	28 09	+0·20	0·50	η Drac. and γ′ Erid.	2	−0·98	The S. P. transits uncertain.
87 Tauri . . . . α	4 27 18·55	73 48	+0·12	0·64	Capel. and Rigel	3	+0·39	A long and good night's work.
Ditto	„	„	0	0·50	η Drac. and γ′ Erid.	3	−0·30	A merid. mark exact.
102 Tauri . . . . . ι	4 54 07·52	68 38	+0·50	0·43	Capel and Rigel	1	+0·24	Levelled with the roof open.
13 Aurigæ . . . α	5 05 36·35	44 10	+0·14	0·75	γ Urs. M. and β Corvi	2	+0·10	A good night's work.
19 Orionis . . . β	5 07 19·65	98 23	−0·02	0·64	Capel and Rigel	2	+0·55	Tried sev. pairs for Azim.
112 Tauri . . . . β	5 16 48·55	61 31	+0·37	1·00	Mean and Spica	1	+0·46	Level W. +0″·49.
Ditto	„	„	+0·22	0·43	Capel. and Rigel	3	+0·19	Epps' az. dev. by same stars=0ˢ·42.
136 Tauri C	5 43 53·74	62 26	+0·38	1·47	ε Gem. and Sirius	0	+0·66	Star too large.
58 Orionis . . . α	5 47 03·00	82 38	−0·01	1·47	ε Gem. and Sirius	0	+1·11	Tolerable figure.
Ditto	„	„	0	0·64	Capel and Rigel	1	+0·46	Level W. +0″·11.
13 Geminorum . . μ	6 13 52·65	67 25	+0·07	1·47	ε Gem. and Sirius	0	+0·76	Irreconcilable with α Orionis.
27 Geminorum . . ε	6 34 41·75	64 44	+0·29	0·42	Castor and ε Can. M.	2	−0·21	Clouds flitting past.
9 Canis Maj. . α	6 38 32·13*	106 30	+0·03	0·24	α² Cast. and ε Can. M.	1	−0·23	Variable night.

OBSERVATIONS.

Date.	Star's name.	Telescope wires. I.	II.	Centre.	IV.	V.	Mean Transit.	Clock's Error.	Daily rate.	Remarks.
		secs.	secs.	h. m. s.	secs.	secs.	s.	s.	s.	
1838 2 Dec.	42 Geminorum *comp.* ω	56·8	17·2	6 52 37·6	58·0	18·4	37·60	+ 0·97	— 1·45	Level E. + 0″·71. Rate with *a* Peg. 8 days previous.
1839 23 Feb.	55 Geminorum *N. A.* δ	36·8	56·8	7 10 16·8	36·9	56·9	16·84	— 15·11	— 1·54	Level W. + 0″·49. Rate by *a* Gem. 2 successive days.
24 „	Ditto	35·3	55·2	7 10 15·3	35·4	55·5	15·34	— 16·60	— 1·50	Rate with itself previous day.
23 Feb.	60 Geminorum *comp.* ι	48·0	9·0	7 15 30·1	51·3	12·1	30·10	— 15·01	— 1·49	Very unsteady. Rate by itself the next day.
24 „	Ditto	. .	7·6	7 15 28·6	49·6	. .	28·6	— 16·50	— 1·49	Rate by itself yesterday.
20 April	66 Geminorum *N.A.* a^2	4·0	26·0	7 23 48·0	10·0	32·0	48·00	— 32·29	— 1·57	Very steady. Rate by Procyon yesterday and to-day.
29 „	Ditto	50·8	12·8	7 24 34·7	56·7	18·7	34·74	+ 14·59	— 1·24	Rate with itself one day. Very steady.
1838 7 May	Ditto	48·5	10·4	7 24 32·3	54·4	16·5	32·42	+ 16·68	— 0·95	Rate with itself 3 days after. Large power eye-piece No. 4 now applied.
1839 23 Feb.	10 Canis Minoris *N.A.* *a*	1·5	20·2	7 30 38·9	57·5	16·2	38·86	— 15·10	— 1·49	Star very faint. Rate by δ Gem. 2 successive days.
24 „	Ditto	59·4	18·0	7 30 36·7	55·4	14·0	36·70	— 17·26	— 2·16	Star very faint. Rate by itself yesterday.
16 April	Ditto	49·2	8·0	7 30 26·7	45·5	4·0	26·68	— 26·58	— 1·80	Tolerably steady. Rate with Sirius 5 days previous.
19 „	Ditto	44·9	3·6	7 30 22·1	40·7	59·5	22·16	— 31·05	— 1·49	Very steady. Rate by itself 3 days.
20 „	Ditto	43·1	1·9	7 30 20·7	39·3	57·9	20·58	— 32·62	— 1·57	Rate by itself yesterday.
29 „	Ditto	30·0	48·7	7 31 07·3	25·8	44·6	7·28	+ 14·28	— 0·87	Clock put forward 22nd. Rate with Spica yesterday.
2 May	Ditto	26·7	45·2	7 31 04·0	22·8	41·4	4·02	+ 10·99	— 1·10	Rate with itself 3 days previous.
5 „	Ditto	23·7	42·3	7 31 01·0	19·8	38·4	1·04	+ 8·03	— 0·99	Rate with itself 3 days previous. Large power eye-piece No. 4 now applied.
23 Feb.	78 Geminorum *N. A.* β	32·0	53·2	7 35 14·4	35·6	56·8	14·40	— 14·94	— 1·15	Faint through clouds. Rate with Aldeb. 6 days previous.
24 „	Ditto	30·7	51·7	7 35 12·8	33·9	55·0	12·82	— 16·51	— 1·57	Rate by itself yesterday.
6 April	Ditto	36·9	58·0	7 35 19·0	40·1	1·3	19·06	— 9·67	— 1·17	Pretty Good. Rate with Reg. 5 days previous when clock was put forward.
16 „	Ditto	20·5	41·5	7 35 02·6	23·7	44·8	2·62	— 25·93	— 1·63	Rate by itself 10 days previous. Star faint.
19 „	Ditto	16·0	37·0	7 34 58·0	19 0	40·3	58·06	— 30·44	— 1·50	Clear and steady. Rate with itself 3 days previous. Level E. + 0″·42
20 „	Ditto	14·2	35·4	7 34 56·6	17·7	38·8	56·54	— 31·95	— 1·51	Rate by itself yesterday.
29 „	Ditto	0·9	21·9	7 35 42·9	4·0	25·2	42·98	+ 14·63	— 1·06	Clock put forward on 22d. Rate with Arcturus 2 days previous.
2 May	Ditto	57·9	19·0	7 35 40·0	1·0	22·2	40·02	+ 11·72	— 0·97	Rate with itself 3 days previous.
5 „	Ditto	54·9	16·0	7 35 37·0	58·1	19·2	37·04	+ 8·77	— 0·98	Rate by itself 3 days previous.

DEDUCTIONS.

Star's name.	AR. 1 Jan. 1850.	Approx. P.D.	Δ Ast. C.	Daily Azim. Dev. E.	Star's compared for daily Azim.	Wt.	Az. correction.	Remarks.
	h. m. s.	° ′	s.	s.			s.	
42 Geminorum . . ω	6 53 15·93	65 34	+0·45	1·47	ε Gem. and Sirius	0	+0·75	Agrees best with C Tauri.
55 Geminorum . . δ	7 11 09·44	67 45	+0·14	0·42	a^2 Cast. and ε Can. M.	2	—0·24	Clouds flitting past.
Ditto	„	„	+0·15	0·24	a Ditto	1	—0·13	Haze increasing.
60 Geminorum . . ι	7 16 24·33	61 55	+0·19	0·42	Ditto	2	—0·19	Very unsteady.
Ditto	„	„	+0·23	0·24	Ditto	1	—0·11	Uncertain by clouds.
66 Geminorum . . a^2	7 25 01·41	57 47	+0·08	0·81	ι Urs. M. and a Hydr.	3	—0·32	Very steady.
Ditto	„	„	+0·20	1·00	η Urs. M. and Spica	2	+0·40	Also very steady.
Ditto	„	„	+0·26	1·00	Mean and Spica	1	+0·40	A troublesome night.
10 Canis Minoris . a	7 31 26·71	84 24	+0·23	0·42	a^2 Cast and ε Can M	2	—0·30	Level W. + 0″·49.
Ditto	„	„	—0·45	0·24	Ditto	0	—0·17	This the only bad transit to-night.
Ditto	„	„	—0 20	0·30	γ Ceph. S.P. and β Corvi	0	—0·14	An irregular night.
Ditto	„	„	—0·15	0·45	γ Urs. M. and β Corvi	2	—0·32	A good night's work.
Ditto	„	„	+0·01	0·81	ι Urs. M. and a Hydr.	3	—0 58	Only Pollx out of bounds.
Ditto	„	„	+0·13	1·00	η Urs. M. and Spica	3	+0·72	A long series.
Ditto	„	„	—0·48	0·50	γ Urs. M. and β Corvi	0	+0·35	Transit swagged to-night.
Ditto	„	„	—0·31	0·48	Ditto	0	+0·35	Transit again wavered.
78 Geminorum N.A. β	7 36 07·42	61 37	+0·26	0·42	Cast.² and ε Can. M.	1	—0·19	Level W. + 0″·49.
Ditto	„	„	+0·24	0·24	Mean of Grh stars	1	—0·11	Good short series.
Ditto	„	„	+0·69	W. ·20	a Urs. M. and Reg.	0	+0·09	Very few transits.
Ditto	„	„	+0·31	0·20	γ Urs. M. and β Corvi	0	—0·09	Pollux as usual differs from the rest each night.
Ditto	„	„	+0·34	0·45	Ditto	1	—0·20	A good night's work.
Ditto	„	„	+0·48	0·81	ι Urs. M. and a Hydr.	0	—0·37	The clock error by this star too small with a slow clock.
Ditto	„	„	+0·30	1·00	η Urs. M. and Spica	1	+0·45	The clock error by this star too large with a fast clock.
Ditto	„	„	+0·12	0·47	Castor² and β Corvi	2	+0·22	Compared with the orthodox reduction.
Ditto	„	„	+0·30	0·48	γ Urs. M. and β Corvi	1	+0·22	Transits very regular; also compared as above.

OBSERVATIONS.

Date.	Star's name.	Telescope wires. I.	II.	Centre.	IV.	V.	Mean Transit.	Clock's Error.	Clock's Daily rate.	Remarks.
		secs.	secs.	h. m. s.	secs.	secs.	s.	s.	s.	
1839 25 Feb.	19 Cancri *comp.* . λ	0·7	21·0	8 10 41·4	1·7	22·0	41·36	—17·47	—0·87	Rate with δ Gem. yesterday. The discrepancy of this rate with the following should be examined.
„	43 Cancri *comp.* . γ	1·2	21·3	8 33 41·5	1·7	21·8	41·50	—18·17	—1·57	Rate with δ Gem. yesterday.
20 April	47 Cancri *comp.* . δ	21·7	41·2	8 35 0·8	20·5	40·0	0·84	—32·19	—1·05	Rate with β Leon. yesterday. Level E. + 0″·42.
21 „	Ditto	19·9	39·4	8 34 59·1	18·7	38·3	59·08	—33·94	—1·75	Rate with itself yesterday. Cloudy.
1838 21 April	11 Hydræ *N. A.* . ε	3·8	22·5	8 37 41·0	59·7	18·2	41·04	—31·55	—0·58	Feared much parallax. Level W. + 1″·47. Rate with Reg. 2 days previous.
1839 25 March	77 Cancri *comp.* . ξ	34·0	54·2	9 0 14·5	34·8	54·9	14·48	+ 7·03	—1·58	Rate with Reg. 3 days after. Returned axis to its usual position, illumined end W.
20 April	Ditto	54·7	14·9	8 59 34·9	55·0	15·1	34·92	—32·18	—1·67	Very steady. Rate with δ Leonis yesterday.
21 „	Ditto	53·0	13·0	8 59 33·0	53·0	13·3	33·06	—34·02	—1·84	Rate with itself yesterday.
1838 21 April	22 Hydræ *comp.* . θ	48·6	7·0	9 05 25·7	44·0	2·8	25·62	—31·55	—0·58	Rate with Reg. 2 days previous. Level W. + 1″·47.
1839 6 April	5 Cephei *N. A.* S.P. α	14·0	53·5	9 14 32·8	12·5	51·5	32·86	— 8·97	—1·42	Rate with γ Ceph. 10 days previous.
24 April	30 Hydræ *N. A.* . α	24·0	42·9	9 20 01·8	20·3	39·0	1·60	+19·77	—1·07	Steady. Put clock forward. Rate by α Orion. next day.
25 Feb.	4 Leonis *comp.* . λ	35·0	55·2	9 22 15·6	35·8	56·0	15·52	—18·17	—1·57	Rate by δ Gem. previous day.
21 April	Ditto	18·7	39·0	9 21 59·3	19·7	39·9	59·32	—33·92	—1·74	Steady. Rate with ξ Cancri yesterday.
25 Feb.	14 Leonis *comp.* . ο	38·8	57·9	9 32 16·8	35·8	54·9	16·84	—18·40	—1·67	Rate with Reg. 2 days after.
21 April	16 Leonis *comp.* . ψ	46·5	5·7	9 34 24·8	44·0	3·2	24·84	—34·02	—1·83	Rate by δ Canc. yesterday. Hazy.
28 March	17 Leonis *N. A.* . ε	6·4	26·9	9 36 47·3	7·6	28·0	47·24	+ 2·94	—1·36	Cloudy, star faint. Rate with ξ Cancri 3 days previous.
6 April	Ditto	53·7	14·0	9 36 34·4	54·8	15·0	34·38	— 9·82	—1·51	Level E. + 0″·51. Rate with Sirius next day.
10 „	Ditto	47·4	7·8	9 36 28·0	48·4	8·9	28·10	—16·05	—1·56	Rate with itself 4 days previous.
28 March	24 Leonis *comp.* . μ	59·2	20 0	9 43 40·8	1·5	22·2	40·74	+ 3·38	—0·32	Unsteady. This error exceeds that of ε Leonis by 0·44, though very near in P.D.
28 March	29 Leonis *comp.* . π	8·8	27·5	9 51 46·2	5·0	23·8	46·26	+ 2·45	—1·33	Unsteady. Rate with σ Leon. yesterday.
25 March	30 Leonis *comp.* . η	3·0	22·5	9 58 42·0	1·5	21·0	42·00	+ 7·00	—1·65	Extremely faint. Rate with ρ Leon. 2 days after.

DEDUCTIONS.

Star's name.	AR. 1 Jan. 1850.	Approx. P.D.	Δ Ast. C.	Daily Azim. Dev. E.	Star's compared for daily Azim.	Wt.	Az. correction.	Remarks.
	h. m. s.	° ′	s.	s.			s.	
19 Cancri . . . λ	8 11 36·21	65 30	+ 0·90	0·50	η Drac. S.P. and γ Erid.	0	— 0·25	Unfavourable P.D. for the instrument.
43 Cancri . . . γ	8 34 35·70	68 00	+ 0·23	0·50	Ditto	1	— 0·27	N. merid. mark exactly central.
47 Cancri . . . δ	8 36 08·95	71 18	+ 0·39	0·81	ι Urs. M. and α Hydr.	1	— 0·46	Very steady.
Ditto	„	„	+ 0·47	0·53	Ditto	0	— 0·31	Steady, but some stars wild.
11 Hydræ . . . ε	8 38 49·76	83 02	— 0·46	0·41	Aldeb. and β Corvi	0	— 0·29	Transits begin to be regular.
77 Cancri . . . ξ	9 00 43·51	67 21	+ 0·26	0·62	Capel. and Rigel	2	+ 0·33	Level W. + 0″·56.
Ditto	„	„	+ 0·38	0·81	ι Urs. M. and α Hydr.	1	— 0·42	Very steady.
Ditto	„	„	+ 0·29	0·53	Ditto	2	— 0·27	In P.D. 61° to 68° clock error, too small when — and too large when +.
22 Hydræ . . . θ	9 06 33·14	87 03	— 0·42	0·41	Aldeb. and β Corvi	0	— 0·36	An initiatory night.
5 Cephei S.P. . . α	9 14 58·26	S.P. 28 03	+ 1·17	W. ·20	α Ursæ M. and Regulus	0	+ 0·39	A puzzling night.
30 Hydræ . . . α	9 20 12·65	98 00	— 0·11	0·64	Capel. and Rigel	2	+ 0·55	Steady. Level W. 0″·11.
4 Leonis . . . λ	9 23 09·23	66 23	+ 0·28	0·50	η Drac. S.P. and γ Erid.	2	— 0·25	N. merid. mark exact
Ditto	„	„	+ 0·52	0·53	ι Urs. M and α Hydr.	1	— 0·27	Steady.
14 Leonis . . . ο	9 33 08·12	79 26	+ 0·07	0 50	η Drac. S.P. and γ Erid.	3	— 0·33	A moon culminator.
16 Leonis . . . ψ	9 35 33·27	75 18	+ 0·49	0·53	ι Urs. M. and α Hydr.	1	— 0·33	An interesting Lunar series.
17 Leonis . . . ε	9 37 19·40	65 32	+ 0·55	0·47	μ Urs. M. and Reg.	0	+ 0·24	A stiff night.
Ditto	„	„	+ 0·64	W. ·20	α Urs. M. and Reg.	1	+ 0·10	A puzzling night.
Ditto	„	„	+ 0·26	0	θ Urs. M. and Sirius	1	0	No satisfactory az. dev.
24 Leonis . . . μ	9 44 13·08	63 17	+ 0·98	0·47	μ Urs. M. and Reg.	0	+ 0·22	Re-examined in vain.
29 Leonis . . . π	9 52 16·90	81 14	+ 0·16	0·47	Ditto	3	+ 0·32	A full night.
30 Leonis . . . η	9 59 08·61	72 30	+ 0·32	0·62	Capel. and Rigel	1	+ 0·32	Few transits.

OBSERVATIONS.

Date.	Star's Name.	Telescope wires. I.	II.	Centre.	IV.	V.	Mean Transit.	Clock's Error.	Daily rate.	Remarks.
		secs.	secs.	h. m. s.	secs.	secs.	s.	s.	s.	
1839 10 April	32 Leonis *N. A.* . *a*	55·0	14·0	9 59 33·0	52·0	11·2	33·04	—16·53	—1·52	Rate with Reg. 4 days previous.
19 „	Ditto	40·0	59 0	9 59 18·0	37·0	56·4	18·08	—31·39	—1·65	Rate with itself 9 days previous.
24 „	Ditto	31·0	50·0	10 0 9·2	28·5	47·8	9·30	+19·89	—1·23	Rate with itself next day. Tremulous. Level W. + 0″·11. Clock put forward.
15 July	Ditto	07·9	26·7	9 59 45·5	04·5	23·7	45·66	— 3·09	—0·04	Rate with Aldeb. 3 days previous. The clock pendulum was raised 3 divisions on 17th June, which corrected its rate.
27 Feb.	33 Ursæ Majoris *comp.* λ	12·0	37·8	10 07 03·5	29·2	55·0	3·50	—20·82	—1·36	AR. from Cat. of 1112 stars. Rate with Castor 3 days previous.
28 March	Ditto	36·0	01·6	10 07 27·2	53·0	18·7	27·30	+ 2·77	—1·48	Tolerably good. Rate with Capel. 3 days previous.
1 April	Ditto	29 4	55·0	10 07 20·9	46·6	12·4	20·88	— 3·60	—1·57	Rate with itself 4 days previous.
6 „	Ditto	23·0	48·6	10 07 14·5	40·0	05·7	14·36	—10·06	—1·29	Rate with itself 5 days previous.
10 „	Ditto	16 5	42·3	10 07 08·0	33·8	59·5	8·02	—16·34	—1·57	Rate with itself 4 days previous.
27 Feb.	41 Leonis *comp.* . γ	06·8	26·7	10 10 46·5	06·2	26·2	46·48	—20·81	—1·40	Rate with δ Gem. 3 days previous.
1 April	34 Ursæ Majoris *comp.* μ	51·8	16·9	10 12 42·0	07·2	32·2	42·02	— 3·56	—1·51	Rate with itself 4 days previous.
6 „	Ditto	45·0	10·0	10 12 35·2	00·4	25·6	35·24	—10·28	—1·68	Rate with itself 5 days previous.
10 „	Ditto	39·0	04·0	10 12 29·0	54·2	19·4	29·12	—16·38	—1·52	Rate with itself 4 days previous.
27 Feb.	42 Hydræ *comp.* . μ	19·8	39·0	10 17 58·4	17·9	37·2	58·46	— 21·93	—1·88	Rate comp. with γ′ Erid. 2 days previous.
27 Mar.	47 Leonis *comp.* . ρ	. .	6·6	10 24 25·6	44·4	3·2	25·49	+03·70	— 1·65	Flying clouds. Rate with η Leo. 2 days previous.
27 Feb.	53 Leonis *comp.* . *l*	50·0	9·0	10 40 28·0	47·0	6·0	28·00	— 21 23	— 1·54	Rate with Aldeb. 2 days previous.
1838 8 May	50 Urs. Majoris *N. A.* *a*	37·8	18·3	10 53 58·7	39·0	19·1	58·58	+15·06	—0·73	W. End level + 0″·68. Rate with itself 2 days after.
1839 5 May	Ditto	35·5	15·8	10 53 56·2	36·5	16·9	56·18	+08·26	—1·16	Rate with *a* Drac. 6 days after.
1838 3 May	63 Leonis *comp.* . χ	23·1	42·2	10 56 01·0	20·0	38·8	1·02	— 39·88	—1·17	Rate with γ Virg. 2 days after. No error of collimation.
1839 27 Feb.	Ditto	45·4	4·2	10 56 23·0	41·9	0·7	23·04	—21·45	—1·40	Rate with Procyon 3 days previous.
24 April	Ditto	27·0	45·8	10 57 04·4	23·0	41·8	4·40	+19·99	— 1·06	Rate with *a* Orion, 2 days after. Level W. + 0″·11. Weather clear, but stars tremulous.
5 May	Ditto	15·0	34·0	10 56 52·5	11·0	30·0	52·50	+ 08·69	— 0·77	Rate with Procyon 3 days previous.

DEDUCTIONS.

Star's name.	AR. 1 Jan. 1850.	Approx. P.D.	Δ Ast. C.	Daily Azim. Dev. E.	Stars compared for daily Azim.	Wt.	Az. correction.	Remarks.
	h. m. s.	° ′	s.	s.			s.	
32 Leonis . . . α	10 00 22·71	77 18	—0·19	0	θ Ursæ Maj. and Sirius	0	0	This transit must be wrong.
Ditto	,,	,,	—0·37	0 45	γ Urs. M. and β Corvi	0	—0·29	
Ditto	,,	,,	—0·09	0·64	Capella and Rigel	1	+0·42	A long series.
Ditto	,,	,,	+0·07	0·49	γ Drac. and μ Sagitt.	3	—0·31	Steady night.
33 Ursæ Majoris . λ	10 08 02·06	46 20	+0·67	0·16	α Ursæ Maj. and Reg.	0	+0·33	The Astr. Soc. Cat. differs by $0^{s}{\cdot}20$ from that of 1112 stars.
Ditto	,,	,,	+0·26	0·47	μ Ursæ Maj. and Reg.	3	+0·09	Five unknown stars to-night
Ditto	,,	,,	—0·02	0·49	γ Ursæ Maj. and Reg.	3	—0·10	Pretty good.
Ditto	,,	,,	+0·49	W.0·20	α Ursæ Maj. and Reg.	0	+0·04	Or Az. dev. E. 1″·10.
Ditto	,,	,,	+0·01	E. 0	θ Ursæ Maj. and Sirius	3	0	Unsatisfactory night.
41 Leonis, *comp.* . γ	10 11 41·01	69 24	+0·94	0·16	α Ursæ Maj. and Reg.	0	+ 0.09	Greenwich stars too close.
34 Ursæ Majoris . μ	10 13 22·59	47 45	+0·03	0·49	γ Ursæ Maj. and Reg.	1	—0·11	Epps computed a pivot equation.
Ditto	,,	,,	+0·29	W.0·20	α Ursæ Maj. and Reg.	2	+0·04	Few transits and irregular.
Ditto	,,	,,	—0·03	E. 0		3	0	Irregular transits.
42 Hydræ . . . μ	10 18 49·91	106 04	+0·45	0·16	α Ursæ Maj. and Reg.	1	+0·15	Greenwich stars too close.
47 Leonis . . . ρ	10 24 54·46	79 49	—0·13	0·45	By estimation.	0	+0·31	No good Greenwich stars.
53 Leonis . . . l	10 41 21·95	78 40	+0·50	0·16	α Ursæ Maj. and Reg.	1	+0·11	Transits far north not safe.
50 Ursæ Majoris . α	10 54 25·98	27 27	—0·31	0·61	η Ursæ Maj. and Spica	6	—0·24	Returned axis to illumined end W.
Ditto	,,	,,	—0·48	0·48	γ Urs. M. and β Corvi	0	—0·20	Compared with orthodox reduction, the only discordant observation.
63 Leonis . . . χ	10 57 15·97 *	81 51	+0·42	2·20	γ Cep. S.P. and Spica	0	+0·11	No sensible collimation.
Ditto	,,	,,	+0·28	0·16	α Ursæ Maj. and Reg.	3	+0·11	Irregular night.
Ditto	,,	,,	+0·07	0·64	Cap. and Rigel.	2	+0·45	Tough night.
Ditto	,,	,,	+0·49	0·48	γ Urs. M. and β Corvi	3	+0·34	Agrees with the orthodox.

OBSERVATIONS.

Date.	Star's name.	Telescope wires. I.	II.	Centre.	IV.	V.	Mean Transit.	Clock's Error.	Daily rate.	Remarks.
		secs.	secs.	h. m. s.	secs.	secs.	s.	s.	s.	
1838 6 May	68 Leonis, *N. A.* . δ	8·5	28·1	11 04 48·0	8 5	28·0	48·22	— 42·41	— 0·84	Rate with κ Leo. 3 days previous. Level W. + 0″·13, illum. end W.
8 „	Ditto	6·4	26·0	11 05 46·0	6 0	26·0	46·08	+ 15·47	— 0·54	Rate with Arct. the previous day. Level W. end + 0″·37.
7 June	Ditto	. .	. .	11 05 02·7	22·8	42·8	2·75	— 27·54	— 1·30	Rate with Arct. 8 days previous. Object glass defective.
1839 19 April	Ditto	24·0	43·8	11 05 03·8	23·8	43·8	3·84	— 30·51	— 1·53	Steady. Rate with Pollux 3 days previous. Level E. + 1″·25.
24 April	Ditto	14·9	34·7	11 05 54·6	14·4	34·4	54·60	+ 20·29	— 1·08	Rate with Poll. 2 days previous.
5 May	Ditto	2·6	22·8	11 05 42·8	2·8	22·9	42·78	+ 08·57	— 1·10	Rate with itself 2 days previous.
1838 6 May	12 Hydræ et Crateris *N.A.* . . . . . . δ	54·8	14·0	11 10 32·9	52·0	11·0	32·94	— 43·16	— 1·04	Rate with Spica 3 days previous.
8 May	Ditto	52·8	11·9	11 11 30·9	50·0	9·5	31·02	+ 14·95	— 1·06	Rate with Arct. yesterday.
1839 19 April	Ditto	10·0	29·0	11 10 48·0	7·3	26·6	48·18	— 31·39	— 1·51	Lev. E. + 0″·42 Rate with β Corvi 2 days previous.
24 „	Ditto	1·0	19·9	11 11 39·0	58·0	17·2	39·02	+ 19·48	— 1·05	Rate with itself 11 days after.
5 May	Ditto	49·2	8·2	11 11 27·2	46·4	5·6	27·32	+ 7·88	— 1·05	Rate with itself 11 days before.
1838 3 May	77 Leonis *comp.* . σ	31·0	49·7	11 12 08·5	27·0	46·0	8·44	— 40·05	— 1·08	Rate with δ Hyd. Cr. 3 days sub.
1839 27 Mar.	Ditto	18·2	37·0	11 12 55·7	14·3	33·0	55·64	+ 3·78	— 1·42	Rate with itself next day.
28 Mar.	Ditto	16·8	35·5	11 12 54·2	13·0	31·6	54·22	+ 2·36	— 1·42	Rate with itself yesterday.
1838 21 April	15 Hydræ et Crateris *comp.* . . . . γ	39·2	57·9	11 16 17 5	36·8	56·3	17·54	— 31·40	— 0·78	Rate with δ Hyd. et Cr. 15 days sub. Level W. + 1″·84.
1839 24 April	84 Leonis . . . τ	23·7	42·3	11 20 01·0	19·6	38·2	0·96	— 19·51	— 1·06	Rate with δ Hyd. et Cr. 11 days after.
1838 21 April	21 Hydræ et Crateris *comp.* . . . . θ	32·4	50·4	11 28 09·5	28·0	46·5	9·36	— 31·27	— 0·73	Rate with Spica 12 days after. Level W. + 1″·84.
1839 28 Mar.	91 Leonis *comp.* . υ	9·3	27·9	11 28 46·5	5·1	23·8	46·52	+ 2·24	— 1·54	Rate with σ Leo. yesterday. N.A. makes clk. + 0·85 only.
5 May	35 Cephei *N. A.* S.P. γ	10·0	31·0	11 32 52·0	13·0	33·8	51·96	+ 8·93	— 1·33	Rate with itself 2 days before.
1838 21 April	94 Leonis *N. A.* . β	40·0	59·0	11 40 18·5	37·5	56·7	18·34	— 31·07	— 0·77	Rate with δ Leo. 5 days previous. Level W. + 1″·84.
7 June	Ditto	42·4	1·8	11 40 21·1	40·5	0·1	21·18	— 27·84	— 1·47	Rate with Arct. 2 days after.
1839 17 April	Ditto	46·0	5·5	11 40 25·0	44·0	3·3	24·76	— 28·09	— 1·65	Rate with Reg. 7 days previous.
19 April	Ditto	43·0	2·5	11 40 21·8	41·0	0·2	21·70	— 31·14	— 1·53	Level E. + 0″·42. Rate with itself 2 days previous.

DEDUCTIONS.

Star's name.	AR. 1 Jan. 1850.	Approx. P.D.	Δ Ast. C.	Daily Azim. Dev. E.	Stars compared for daily Azim.	Wt.	Az. correction.	Remarks.
	h. m. s.	° ′	s.	s.			s.	
68 Leonis . . . δ	11 06 06·97	68 39	+0·32	0·66	Capella and Sirius	0	−0·36	Axis, illuminating end W.
Ditto	,,	,,	+0·47	0·61	η Urs. Maj. and α² Lib.	1	+0·33	Again reversed axis.
Ditto	,,	,,	+0·31	0·87	η Ursæ Maj. and Spica	0	−0·48	A good night's work.
Ditto	,,	,,	+0·54	0·45	γ Urs. M. and β Corvi	1	−0·25	Stars north of zenith no help.
Ditto	,,	,,	+0·29	0·64	Capella and Rigel	1	+0·39	A good night's work.
Ditto	,,	,,	+0·30	0·48	γ Urs. M. and β Corvi	2	+0·26	Agrees with orthodox reduction.
12 Hydræ and Crateris δ	11 11 50 60	103 58	−0·18	0·66	Capella and Sirius	0	−0·62	The only unknown star was γ Virg.
Ditto	,,	,,	+0·10	0·61	η Urs. M. and α² Lib.	0	+0·58	North stars unsafe.
Ditto	,,	,,	−0·16	0·45	γ Urs. M. and β Corvi	3	−0·42	Stars north of zenith no aid.
Ditto	,,	,,	−0·26	0·64	Capella and Rigel	1	+0·62	By several comparisons still —.
Ditto	,,	,,	−0·19	0·48	γ Ursæ M. and β Corvi	3	+0·46	Agrees with orthodox reduction.
77 Leonis . . . σ	11 13 23·19	83 09	+0·51	2·30	λ Draco. and Spica	0	−1·67	Not recommended.
Ditto	,,	,,	+0·22	0·45	Brought from 25th ins.	2	+0·32	No good Greenwich stars.
Ditto	,,	,,	+0·13	0·47	μ Ur. M. and α Leo.	3	+0·33	A valuable night.
15 Hydræ and Crateris γ	11 17 23·12	106 51	−0·16	0·41	Aldeb. and β Corvi	3	−0·40	First night reduced.
84 Leonis . . . τ	11 20 12·99	86 19	−0·37	0·64	Capella and Rigel	2	+0·47	Still — by three comparisons.
21 Hydræ and Crateris θ	11 29 04·19	98 58	−0·05	0·41	Aldeb. and β Corvi	2	−0·36	A trial night.
91 Leonis . . . υ	11 29 15·87	90 00	+0·26	0·47	μ Urs. M. and α Leo	3	−0·37	(Epps) Differs by 0·16— in clock-error.
35 Cephei S.P. . . γ	11 33 12·60	S.P. 13 13	+1·04	0·48	γ Urs. M. and β Corvi	2	+1·63	Orthodox correction still more.
94 Leonis . . . β	11 41 24·05	74 35	+0·08	0·41	Aldeb. and β Corvi	0	−0·26	Initiatory night.
Ditto	,,	,,	+0·10	0·87	η Urs. M. and Spica	2	−0·54	Errors large.
Ditto	,,	,,	+0·02	0·50	γ Urs. M. and β Corvi	2	−0·31	Few but good.
Ditto	,,	,,	+0·03	0·45	Ditto	3	−0·28	Fine night.

OBSERVATIONS.

Date.	Star's name.	Telescope wires.					Mean Transit.	Clock's		Remarks.
		I.	II.	Centre.	IV.	V.		Error.	Daily rate.	
		secs.	secs.	h. m. s.	secs.	secs.	s.	s.	s.	
1839 2 May	94 Leonis *N. A.* . β	25·8	45·0	11 41 04·0	23·1	42·5	4·08	+ 11·32	— 0·92	Rate with itself 3 days after.
5 May	Ditto	22·0	42·0	11 41 01·9	20·8	39·8	1·30	+ 08·56	— 0·92	Rate with itself 3 days before.
24 April	5 Virginis *comp.* . β	3·2	21·9	11 42 40·4	59·0	17·7	40·44	+ 19·64	— 1·34	Rate with Sir. 2 days previous. Level W. + 0″·11.
16 April	64 Ursæ Majoris *N. A.* γ	53·0	25·0	11 44 57·0	29·0	1·0	57·00	— 26·46	— 1·31	Rate with itself next day.
19 April	Ditto	48·5	20·8	11 44 52·6	24·5	56·7	52·62	— 30·80	— 1·11	Rate with *a* Cass. 2 days previous.
24 April	Ditto	39·5	11·4	11 45 43·5	15·8	47·9	43·62	+ 20·27	— 1·18	Rate with a mean of 2 days.
1838 24 Nov.	Ditto S.P.	27·5	59·7	23 45 32·0	4·0	35·9	31·82	+ 12·50	— 1·16	Rate with itself 2 days after.
1838 21 April	8 Virginis *comp.* . π	27·2	45·7	11 52 04·3	23·5	42·0	4·54	— 31·43	— 0·70	Rate with χ Leonis 12 days after. Level W. + 1″·84.
1839 2 May	Ditto	13·0	31·7	11 52 50·2	8·9	27·8	50·32	+ 10·98	— 0·98	Rate with Procion 3 days after
28 March	9 Virginis *comp.* . o	27·0	46·0	11 57 05·0	23·9	42·7	4·92	+ 02·24	— 1·46	Very steady. Rate with ρ Leo. yesterday.
24 April	Ditto	44·8	3·7	11 57 22·6	41·5	0·4	22·60	+ 19·94	— 1·26	Rate with η Virg. 3 days after.
2 May	69 Ursæ Majoris *comp.* δ	30·8	5·8	12 07 40·7	15·8	51.0	40·82	+ 12·38	— 0·93	Rate with itself 3 days after.
5 May	Ditto	27·8	2·7	12 07 37·8	12·8	47·8	37·78	+ 09·48	— 0·98	Rate with γ Ursæ Maj. 11 days previous.
28 March	15 Virginis *comp.* . η	7·2	25·8	12 11 44·4	3·0	21·5	44·38	+ 02·17	— 1·44	Good. Rate with *a* Orion. 4 days previous.
19 April	Ditto	34·0	52·5	12 11 11·1	29·6	48·2	11·08	— 31·25	— 1·51	Rate with ε Virg. 2 days before.
27 April	Ditto	21·5	39·9	12 11 58·5	16·9	35·6	58·48	+ 16·17	— 1·26	Rate with o Virg. 3 days before.
19 April	9 Corvi *N. A.* . β	47·0	7·1	12 25 27·2	47·2	7·5	27·20	— 31·35	— 1·55	Rate with itself 3 days previous.
24 April	Ditto	38·0	58·0	12 26 18·0	38·1	58·2	18·06	+ 19·52	— 1·40	Rate with Sirius 2 days previous.
1838 6 May	29 Virginis *comp.* . γ	9·0	27·5	12 32 46·0	4·5	23·0	46·00	— 42·90	— 0·87	Rate with itself 12 days previous.
1839 19 April	Ditto	24·0	42·5	12 33 01·0	19·5	38·0	1·00	— 31·35	— 1·55	Rate with β Corvi 3 days previous.
2 May	Ditto	6·3	25·0	12 33 43·5	2·0	20·7	43·50	+ 11·40	— 1·08	Rate with itself 3 days after.
5 May	Ditto	3·0	21·7	12 33 40·3	58·8	17·5	40·26	+ 08·17	— 1·09	Rate with Sirius 2 days previous.
27 April	12 Canum Venatici *A.S.C.* . . . . . *a*	. .	. .	12 48 48·8	12·7	36·8	48·80	+ 16·88	— 1·21	This clock error agrees with the rest. Rate with Capella 3 days previous.
„	Ditto *N. A.*	. .	. .	. . .	. .	. .	. .	+ 16·41	— 1·36	Only three wires observed.
2 May	Ditto *N. A.*	55·8	19·8	12 48 43·7	7·7	31·6	43·72	+ 11·35	— 1·67	Rate with itself 3 days previous.

DEDUCTIONS.

Star's name.	AR. 1 Jan. 1850.	Approx. P.D.	Δ Ast. C.	Daily Azim. Dev. E.	Star's compared for daily Azim.	Wt.	Az. correction.	Remarks.
	h. m. s.	° ′	s.	s.			s.	
94 Leonis . . . β	11 41 24·05	74 35	−0·03	0·50	γ Urs. M. and β Corvi	1	+0·31	Instrument swagged.
Ditto	”	”	+0·35	0·48	Ditto	3	+0·30	Agrees with orthodox reduction.
5 Virginis . . . β	11 42 52·66*	87 24	−0·21	0 64	Capella and Rigel	1	+0·48	Troublesome night.
64 Ursæ Majoris . γ	11 45 54·67	35 29	−0·03	0·20	γ Ceph. S.P. and β Corvi	2	+0·01	Tried several pairs of stars.
Ditto	”	”	+0·04	0·45	γ Urs. M. and β Corvi	1	+0·04	Star of comparison.
Ditto	”	”	−0·12	0·64	Capella and Rigel	0	−0·06	Near the zenith.
Ditto	”	”	+0·03	0·12	γ Ceph. and Fomal.	1	+0·01	Tried several pairs of stars.
8 Virginis . . . π	11 53 11·09	82 34	−0·25	0·41	Aldeb. and β Corvi	2	−0·28	All low stars except Polaris.
Ditto	”	”	−0·32	0·50	γ Urs. M. and β Corvi	0	+0·35	Clock-error a crooked line.
9 Virginis . . . ο	11 57 34·13*	80 27	+0·06	0·47	μ Urs. M. and α Leo.	2	+0·31	An interesting night.
Ditto	”	”	+0·05	0·64	Capella and Rigel	0	+0·43	A long regular night.
69 Ursæ Majoris . δ	12 07 57·64	32 09	+0·65	0·50	γ Urs. M. and β Corvi	1	+0·10	Agrees with orthodox reduction.
Ditto	”	”	+0·88	0·48	Ditto	2	−0 10	Agrees with orthodox reduction.
15 Virginis . . . η	12 12 12·99	89 50	−0·09	0·47	μ Urs. M. and α Leo.	3	+0·36	A moon culminator.
Ditto	”	”	−0·02	0·45	γ Urs. M. and β Corvi	3	−0·36	Long night.
Ditto	”	”	+0·28	0·81	η Boot. and β Corvi	1	+0·62	Agrees nearly with orthodox reduction.
9 Corvi . . . . β	12 26 30·37	112 34	−0	0·45	γ Urs. M. and β Corvi	0	−0·47	Star comparable to Spica
Ditto	”	”	−0·25	0·64	Capella and Rigel	1	+0·66	Good night's work.
29 Virginis . . . γ	12 34 03·23	90 38	+0·04	0·66	Capella and Sirius	0	−0·53	A short initiatory night.
Ditto	”	”	−0·11	0·45	γ Urs. M. and β Corvi	1	−0·36	Still—by another comparison.
Ditto	”	”	+0·18	0·50	η Urs. M. and β Corvi		+0·40	Compared with orthodox reduction.
Ditto	”	”	+0·08	0·48	Ditto	0	+0·39	Correct. of AR by orthodox reduct.—0·11.
12 Canum Venatici α	12 49 00·25	50 52	+0·08	0·81	η Boot. and β Corvi	2	+0·24	Polaris gives error of AR. —0·09.
Ditto	”	”	−0·39	0·81	Ditto	0	+0·24	This shews that the NA. elements do not suit this star.
Ditto	”	”	−0·11	0·50	γ Urs. M. and β Corvi	2	+0·14	Compared with orthodox reduction.

OBSERVATIONS.

Date.	Star's name.	Telescope wires. I.	II.	Centre.	IV.	V.	Mean Transit.	Clock's Error.	Clock's Daily rate.	Remarks.
		secs.	secs.	h. m. s.	secs.	secs.	s.	s.	s.	
1839 16 April	47 Virginis *comp.* . ε	7·5	26·4	12 53 45·3	4·2	23·1	45·30	—26·93	—1·30	Rate with itself next day.
„	Ditto	. .	. .	. . .	. .	. .	. . .	—26·81	. . .	By A.S.C. only.
17 „	Ditto	6·0	25·0	12 53 44·0	3·0	22·0	44·00	—28·23	—1·30	Good coincidence. Rate with itself previous day.
19 April	Ditto	. .	21·7	12 53 40·9	59·9	18·8	40·84	—31·27	—1·52	Rate with itself 2 days previous.
27 „	Ditto	50·7	9·8	12 54 28·8	47·7	6·7	28·74	+16·62	—1·09	Rate with Reg. 3 days previous.
1838 8 May	67 Virginis *N. A.* . . *a*	18·8	37·6	13 16 56·4	15·5	34·5	56·56	+14·66	—1·10	Rate with itself previous day.
1839 19 April	Ditto	36·0	55·0	13 16 14·0	33·1	52·1	14·04	—31·32	—1·48	Rate with itself 2 days previous.
27 „	Ditto	23·6	42·7	13 17 1·7	20·6	39.3	1·58	+16·19	—1·04	Bad figure. Rate with itself next day.
11 May	79 Virginis *comp.* . ζ	55·7	14·1	13 26 32·7	51·2	10·0	32·74	+ 0·60	—1·20	Mean of rate.
27 April	82 Virginis *comp.* . . *m*	50·8	9·6	13 33 28·2	47·0	5·8	28·28	+15·98	—0·92	Rate with itself 2 days after.
29 „	Ditto	49·0	7·7	13 33 26·4	45·2	4·0	26·46	+14·15	—1·06	Rate with itself 12 days after.
11 May	Ditto	35·8	54·5	13 33 13·0	31·7	50·4	13·08	+ 1·43	—1·20	Mean of rate.
1838 11 May	85 Ursæ Majoris *N.A.* η	26·4	55·2	13 41 24·2	53·3	22·0	24·22	+12·34	—1·21	Rate with itself next day.
30 Aug.	Ditto	24·1	53·0	13 41 21·9	51·0	20·0	22·00	+12·25	—2·04	Very steady. Rate of β Drac.
7 May	8 Bootis *N.A.* . . . η	37·4	57·0	13 47 16·8	36·5	56·0	16·74	+16·13	—1·00	Rate with itself 4 days after.
11 May	Ditto	33·4	53·0	13 47 12·8	32·5	52·0	12·74	+12·12	—0·83	Rate with δ Leo. 2 days after.
8 June	Ditto	50·5	10·5	13 46 30·5	50·5	10·5	30·50	—30·53	—1·70	Steady. Rate with *a* Serp. previous day.
1839 29 April	Ditto	38·6	58·2	13 47 17·9	37·5	57·2	17·88	+14·11	—1·12	Rate with itself previous day.
11 May	Ditto	25·6	45·3	13 47 05·0	24·8	44·7	5·08	+ 1·28	—1·07	Rate with itself 12 days previous.
18 July	Ditto	20·6	40·2	13 47 0·0	20·0	39·8	0·12	— 3·22	—0·10	Clock rate uncommonly steady.
1838 7 May	93 Virginis *comp.* . τ	5·0	23·6	13 53 42·0	1·0	19·5	42·22	+15·90	—0·62	Rate with Arct. next day.
31 „	Ditto	16·4	41·7	13 53 7·0	32·5	57·9	7·10	—19·28	—1·44	Steady, good. Rate by itself 24 days previous.
2 June	Ditto	13·5	39·0	13 53 4·5	30·0	55·5	4·50	—21·85	—1·28	Rate by itself 2 days previous.
4 „	Ditto	24·4	42·8	13 53 1·5	20 2	39·0	1·50	—24·84	—1·50	Rate by itself 2 days previous.
8 „	Ditto	19·0	37·8	13 52 56·3	15·0	33·7	56·36	—30·06	—1·30	App. AR. comp. for 1112 Cat. Rate with itself 4 days previous.
1839 11 May	Ditto	53·4	12·0	13 53 30·6	49·1	7·8	30·58	+ 0·65	—1·23	Rate with Proc. 6 days previous.
1838 31 May	11 Draconis *comp.* . . *a*	. .	45·7	13 59 45·8	46·0	46·5	45·80	—17·79	—0·66	Observed uneasily. Rate small just now.

DEDUCTIONS.

Star's name.	AR. 1 Jan. 1850.	Approx. P.D.	Δ Ast. C.	Daily Azim. Dev. E.	Stars compared for daily Azim.	Wt.	Az. correction.	Remarks.
	h. m. s.	° ′	s.	s.			s.	
47 Virginis . . . ε	12 54 42·83	78 14	— 0 28	0·20	γ Ceph. S.P. and β Cor.	1	— 0·13	Ap. AR. from a mean of A.S.C. and Cat. of 1112 stars.
Ditto	”	”	— 0·13	0·20	Ditto	3	— 0·13	By A.S.C. only.
Ditto	”	”	— 0·02	0·50	γ Urs. M. and β Corvi	3	— 0·33	A regular night.
Ditto	”	”	— 0·07	0·45	Ditto	1	— 0·29	Tried several pairs of stars.
Ditto	”	”	+ 0 11	0·81	η Boot. and β Corvi	3	+ 0·52	An unsteady night.
67 Virginis . . . α	13 17 17·65	100 22	— 0·05	0·61	η Urs. M. and α^2 Lib.	2	+ 0·55	Corrected for level also.
Ditto	”	”	+ 0·02	0·45	γ Urs. M. and β Corvi	3	+ 0·41	A jirk between P.D. 68° and 74°.
Ditto	”	”	— 0·11	0·81	η Boot. and β Corvi	1	+ 0·72	Tried also by Polaris.
79 Virginis . . . ζ	13 27 03·58	89 50	— 0·69	0·20	η Ursæ Maj. and Spica	0	— 0·69	Confirmed by orthodox method.
82 Virginis . . . m	13 33 43·61	97 57	— 0·34	0·81	η Boot. and β Corvi	1	+ 0·69	An interesting night.
Ditto	”	”	+ 0·54	1·00	η Ursæ Maj. and Spica	0	+ 0·87	One of the best nights
Ditto	”	”	+ 0·15	0·20	Ditto	0	+ 0·15	The orthodox reduction gives — 0·62.
85 Ursæ Majoris . η	13 41 36·43*	39 57	0	0·61	γ Drac. and Spica	0	+ 0·03	Initiatory night, index star.
Ditto	”	”	+ 0·20	1·18	β Drac. and β Ophi	1	+ 0·06	Only 5 transits to-night.
8 Bootis . . . . η	13 47 32·36	70 51	+ 0·04	1·00	mean and Spica	1	+ 0·57	Level W. 0″·81.
Ditto	”	”	+ 0·09	0 61	η Ursæ Maj. and Spica	2	+ 0·34	Level W. 2″·35.
Ditto	”	”	+ 0·13	1·23	mean of 7th and 9th	0	— 0·70	No low Greenwich star.
Ditto	”	”	+ 0·20	1·00	η Ursæ Maj. and Spica	2	+ 0·57	By Polaris did not suit so well.
Ditto	”	”	— 0·05	0·20	Ditto	0	+ 0·11	Compared with orthodox reduction.
Ditto	”	”	— 0·11	0·90	η Urs. M. and β′ Scorp.	0	— 0·51	Clock has become steady
93 Virginis . . . τ	13 54 00·83	87 44	+ 0·01	1·00	mean and Spica	3	+ 0·76	A troublesome night.
Ditto	”	”	— 0·22	1·00	a mean	1	— 0·76	Only four transits.
Ditto	”	”	— 0·13	0·50	η Ursæ Maj. and mean	2	— 0 38	Only three transits.
Ditto	”	”	— 0·22	1·35	η Ursæ Maj. and Spica	0	— 1·01	Short night.
Ditto	”	”	— 0·16	1·23	mean of 7th and 9th	3	— 0·93	Level W. 0″·02.
Ditto	”	”	— 0·73	0·20	η Ursæ Maj. and Spica	0	+ 0·15	Agrees nearly with orthodox reduction.
11 Draconis . . . α	14 00 19·07	24 55	— 0·05	1·00	a mean	3	+ 0·56	Plus because N. of zenith.

OBSERVATIONS.

Date.	Star's Name.	Telescope wires. I.	II.	Centre.	IV.	V.	Mean Transit.	Clock's Error.	Clock's Daily rate.	Remarks.
		secs.	secs.	h. m. s.	secs.	secs.	s.	s.	s.	
1839 27 April	11 Draconis *N.A.* . . α	54·3	38·7	14 0 23·0	7·2	51·2	22·88	+16·95	−0·93	Rate with α Urs. M. 3 days previous.
29 „	Ditto	52·2	36·3	14 0 20·5	4·8	49·0	20·56	+14·64	−1·16	Rate with itself 2 days previous.
1838 4 June	1610 Virginis P. 317 *comp.*	59·0	18·2	14 1 37·4	56·5	16·4	37·50	−24·25	−1·33	Rate with Spica 3 days after. The focus not good.
7 May	16 Bootis *N.A.* . . . α	55·3	15·0	14 8 34·7	54·4	14·1	34·70	+16·01	. .	Clock just put forward.
8 „	Ditto	54·0	14·0	14 8 34·0	53·9	14·0	33·98	+15·28	−0·73	Rate with itself yesterday.
7 June	Ditto	11·5	31·3	14 7 51·1	10·8	30·6	51·06	−27·60	−1·43	Rate with itself since May.
8 „	Ditto	10·0	29·5	14 7 49·2	9·0	28·5	49·24	−29·42	−1·82	Rate with itself yesterday.
28 Sept.	Ditto	46·6	6·4	14 8 26·2	46·0	5·8	26·20	+ 8·75	−2·19	Rate with itself 6 days previous.
1839 27 April	Ditto	59·0	18·7	14 8 38·4	58·2	18·0	38·46	+16·76	−1·17	Rate with δ Leo. 3 days previous.
29 „	Ditto	56·5	16·2	14 8 36·0	55·8	15·7	36·04	+14·32	−1·22	Rate with itself 2 days previous.
11 May	Ditto	43·2	3·0	14 8 23·0	43·0	2·8	23·00	+ 1·24	−1·09	Rate with itself 12 days previous.
5 July	Ditto	39·8	59·4	14 8 19·1	39·0	58·9	19·24	− 2·26	−0·12	Clock uncommonly steady. Rate with itself 10 days previous.
18 „	Ditto	39·0	58·5	14 8 18·4	38·0	58·0	18·38	− 2·99	−0·07	Rate with itself 13 days previous.
1838 7 May	100 Virginis *comp.* . . λ	1·0	20·0	14 10 39·0	58·0	17·0	39·00	+15·52	−1·03	Rate with itself next day.
8 „	Ditto	0	19·0	14 10 38·0	57·0	15·9	37·98	+14·49	−0·91	Rate with δ Scorp. 2 days after.
1839 27 April	Ditto	5·0	24·0	14 10 43·0	2·0	21·0	43·00	+16·00	−1·21	Rate with itself next day.
1838 4 June	2 Libræ *comp.*	42·0	1·0	14 14 20·0	39·0	58·0	20·00	−24·39	−1·36	Bad focus. Rate with β Libræ 3 days after.
1839 5 July	27 Bootis *comp.* . . γ	48·0	12·0	14 25 36·0	0	23·8	35·96	− 2·11	−0·11	Clock rate small, with α Cyg.
1838 7 June	36 Bootis *N.A.* . . ε	48·0	9·0	14 37 29·8	50·7	11·8	29·86	−27·27	−1·05	Rate with itself 2 days before.
28 Sept.	Ditto	22·8	43·8	14 38 4·8	25·8	46·8	4·80	+ 9·09	−0·97	Steady. Rate with γ Aqui. previous day.
1839 29 April	Ditto	32·5	53·5	14 38 14·5	35·5	56·5	14·50	+14·50	−1·29	Rate with itself previous day.
5 July	Ditto	15·8	36·8	14 37 57·8	18·8	39·8	57·80	− 2·05	−0·04	Clock steady. Rate with itself 4 days previous.
29 April	9 Libræ *N.A.* . . α^2	36·5	55·8	14 42 15·0	34·5	53·6	15·08	+13·52	−1·16	Rate with itself previous day.
18 July	Ditto	19·7	39·0	14 41 58·0	17·1	36·2	58·00	− 3·50	−0·09	Rate with μ′ Sagit. 13 days before. Clock very steady.
1838 8 May	20 Libræ *comp.* . . γ	12·8	33·3	14 54 53·5	13·8	34·0	53·48	+14·77	−0·75	This is also called γ Scorp. Rate with λ Virg. 1 day previous.
1839 29 April	Ditto	14·8	35·3	14 54 56·0	16·6	37·2	55·98	+13·50	−1·03	Rate with itself previous day.
18 July	42 Bootis *comp.* . . β	3·0	27·7	14 55 52·1	17·0	41·8	52·32	− 2·65	−0·03	Small rate with α Cygni 14 days previous.

DEDUCTIONS.

Star's name.	AR. 1 Jan. 1850.	Approx. P.D.	Δ Ast. C.	Daily Azim. Dev. E.	Stars compared for daily Azim.	Wt.	Az. correction.	Remarks.
	h. m. s.	° ′	s.	s.			s.	
11 Draconis . . . α	14 00 09·	24 53	—0·49	0·81	η Boot. and β Corvi	0	—0·45	Not safe N. of zenith.
Ditto	"	"	—0·40	1·00	η Urs. Maj. and Spica	0	—0·58	Minus because N of zenith.
1610 Virginis P. 317	14 02 38·81	105 35	+0·66	1·35	η Urs. Maj. and Spica	1	—1·30	Very short night.
16 Bootis . . . . α	14 08 48·91	70 02	—0·05	1·00	Mean and Spica	3	+0·56	Only two unknown stars.
Ditto	"	"	+0·38	0·61	η Ur. Maj. and α^2 Lib.	3	+0·35	Level W. 0″·37.
Ditto	"	"	+0·41	0·87	η Urs. Maj. and Spica	1	—0·49	Tolerable night.
Ditto	"	"	+0·27	1·23	Mean of 7th and 9th	0	—0·69	Stars irregular.
Ditto	"	"	+0·29	1·30	Mean and δ Aqui.	3	+0·73	Level W. + 0″·64.
Ditto	"	"	+0·23	0·81	η Boot. and β Corvi	3	+0·45	An important night.
Ditto	"	"	+0·42	1·00	η Urs. Maj. and Spica	2	+0·56	A long series.
Ditto	"	"	—0·07	0·20	Ditto	3	+0·11	Agrees nearly with the orthodox reduction.
Ditto	"	"	—0·01	0·40	γ Drac. and α Ophiu.	1	—0·22	Level E. + 0″·80.
Ditto	"	"	+0·12	0·90	η Ur. Maj. and β′ Scorp.	2	—0·50	Clock steady at last.
100 Virginis . . . λ	14 10 59·82	102 41	—0·17	1·00	Mean and Spica	2	+0·93	A moon culminator.
Ditto	"	"	—0·20	0·61	η Ur. Maj. and α^2 Lib.	2	+0·56	A troublesome night.
Ditto	"	"	+0·25	0·81	η Boot. and β Corvi	2	+0·73	
2 Libræ	14 15 20·86	101 01	+0·44	1·35	η Urs. Maj. and Spica	3	—1·22	Level W. + 0″·25.
27 Bootis . . . . γ	14 26 02·26	51 03	+0·24	0·40	γ Drac. and α Ophiu.	3	—0·12	Few transits, but regular.
36 Bootis . . . . ε	14 38 25·70	62 19	+0·62	0·87	η Urs. Maj. and Spica	1	—0·40	A good series.
Ditto	"	"	+0·55	1·30	η Ur. Maj. and δ Aqui.	2	+0·60	Nearly all Greenw. stars.
Ditto	"	"	+0·53	1·00	η Urs. Maj. and Spica	0	+0·46	A good night's work.
Ditto	"	"	+0·36	0·40	Ditto	2	—0·18	A steady night.
9 Libræ . . . α^2	14 42 35·40	105 25	+0·08	1·00	η Urs. Maj. and Spica	3	+0·95	A satisfactory night.
Ditto	"	"	—0·03	0·90	η Ur. Maj. and β′ Scorp.	3	—0·86	Good trans. S. of zenith.
20 Libræ . . . . γ	14 55 17·95	114 41	+0·20	0·61	η Ur. Maj. and α^2 Lib.	2	+0·65	A tolerable series.
Ditto	"	"	+0·15	1·00	η Ur. Maj. and Spica	3	+1·07	The clock getting troublesome.
42 Bootis . . . . β	14 56 17·44	49 02	+0·18	0·90	η Ur. Maj. and β′ Scorp.	2	—0·23	Clock rate steady.

OBSERVATIONS.

Date.	Star's name.	Telescope wires.					Mean Transit.	Clock's		Remarks.
		I.	II.	Centre.	IV.	V.		Error.	Daily rate.	
		secs.	secs.	h. m. s.	secs.	secs.	s.	s.	s.	
1838 7 June	27 Libræ *N. A.* . β	14·0	33·0	15 7 51·8	10·6	29·5	51·78	— 28·48	— 1·44	Rate with Spica the next day.
1839 29 April	Ditto	59·4	18·2	15 8 37·0	55·8	14·5	36·98	+ 13·44	— 1·09	Rate with 20 Libræ 1 day before.
4 July	Ditto	43·0	2·0	15 8 21·0	40·9	58·9	20·96	— 2·82	— 0·05	Rate with itself 3 days previous.
15 „	Ditto	43·0	1·7	15 8 20·5	39·0	57·8	20·40	— 3·33	— 0·05	Rate with itself 11 days before.
18 „	Ditto	. .	1·0	15 8 20·0	39·0	. .	20·00	— 3·71	— 0·13	Rate with itself 3 days previous.
1838 28 Sept.	Corona Borealis *N.A.* α	18·0	38·6	15 27 59·5	20·6	41·3	59·60	+ 8·75	— 1·31	Rate with γ Aqui. previous day.
29 Oct.	Ditto	8·0	29·0	15 27 49·9	10·8	31·7	49·88	— 0·72	— 1·29	Rate with γ Aqui. 3 days previous.
1839 15 July	Ditto	10·8	. .	15 27 52·0	13·0	. .	52·00	— 2·86	— 0·15	Rate with itself 3 days previous.
18 „	Ditto	10·0	31·0	15 27 52·0	13·0	34·0	52·00	— 2·82	— 0·01	Rate with itself 3 days previous.
29 April	Libræ *comp.* . . χ	22·2	42·5	15 31 2·8	23·0	43·2	2·74	+ 13·69	— 0·84	Rate with 20 Lib. previous day.
1838 7 June	Serpentis *N. A.* . α	14·0	33·0	15 35 51·8	10·0	29·0	51·56	— 28·35	— 1·68	Rate with Arct. 2 days before.
1839 29 April	Ditto	59·3	18·0	15 36 36·5	55·2	14·0	36·60	+ 13·79	— 1·42	Rate with ε Virg. 2 days previous.
15 July	Ditto	42·6	1·2	15 36 19·9	38·7	57·5	19 98	— 3·11	— 0·05	With large power No. 4. Rate with itself 3 days after.
18 „	Ditto	. .	1·0	15 36 19·8	38·6	. .	19·80	— 3·27	— 0·05	Rate with itself 3 days previous.
29 April	7 Scorpii *comp.* . δ	25·6	45·5	15 51 5·7	25·5	45·9	5·64	+ 13·73	— 1·14	Rate with λ Virg. 2 days previous.
18 July	8 Scorpii *N. A.* . β′	25·2	45·0	15 56 4·6	24·2	44·0	4·60	— 3·51	— 0·06	Wind boisterous. Rate by β Lib. 3 days previous.
18 July	1 Ophiuchi *N. A.* δ	17·0	35·6	16 5 54·2	12·8	31·3	54·18	— 3·49	— 0·05	Rate with β Lib. 3 days previous.
1838 7 June	20 Scorpii *comp.* . σ	14·7	35·0	16 10 55·4	16·0	36·1	55 44	— 28·44	— 1·79	Cloudy. Rate by θ Ophi. following day.
7 June	21 Scorpii *N. A.* . α	22·0	42·8	16 19 3·6	24 3	45·0	3·54	— 28·30	— 1·93	Rate by θ Ophi. following day.
11 May	23 Scorpii *comp.* . τ	20·0	41·0	16 26 2·0	23·0	44·5	2·10	+ 11·18	— 1·52	Rate by itself 26 days after.
7 June	Ditto	41·0	2·0	16 25 23·0	44·0	5·0	23 00	— 28·33	— 1·90	Rate by θ Ophi. the following day.
11 May	25 Scorpii *comp.* P. 170	. .	50·0	16 37 11·0	31·0	51 0	10·67	+ 11·14	— 1·53	Rate with θ Ophi. 27 days after.
8 June	42 Ophiuchi *comp.* . θ	55·6	16·0	17 11 36·4	57·0	17·5	36·50	— 30·23	— 1·93	Rate by Antares previous day.
28 Sept.	23 Draconis *N. A.* . β	54·8	25·2	17 26 55·8	26·3	56·7	55·76	+ 8·47	— 2·31	Rate by α Ceph. 2 days after.

DEDUCTIONS.

Star's name.	AR. 1 Jan. 1850.	Approx. P.D.	△ Ast. C.	Daily Azim. Dev. E.	Stars compared for daily Azim.	Wt.	Az. correction.	Remarks.
	h. m. s.	° ′	s.	s.			s.	
27 Libræ . . . β	15 08 56·35	98 49	— 0·14	0·87	η Urs. Maj. and Spica	1	— 0·77	Few unknown stars.
Ditto	"	"	— 0·09	1·00	η Urs. Maj. and Spica	1	+ 0·88	Level nearly correct.
Ditto	"	"	— 0·17	0·63	α Cyg. and α² Capr.	0	— 0·55	Some stars wild to-night.
Ditto	"	"	— 0·03	0·49	γ Drac. and μ Sagitt.	3	— 0·43	Sure of the deviation.
Ditto	"	"	— 0·30	0·90	η Ur. Maj. and β′ Scorp.	0	— 0·80	Good only S. of zenith.
Corona Borealis . α	15 28 19·62	62 47	+ 0·30	1·30	η Ur. Maj. and δ Aqui.	3	+ 0·61	Level W. + 0″·64.
Ditto	"	"	+ 0·51	1·28	α Cyg. and α² Capric.	1	— 0·59	A good range of stars.
Ditto	"	"	+ 0·24	0·49	γ Drac. and μ Sagitt.	2	— 0·23	Safe in the deviation.
Ditto	"	"	+ 0·19	0·90	η Ur. Maj. and β′ Scorp.	1	— 0·42	Clock rate all but perfect.
Libræ . . . . χ	15 31 24·06	113 19	+ 0·35	1·00	η Urs. Maj. and Spica	2	+ 1·05	Level same as yesterday, nearly correct.
Serpentis . . . . α	15 36 52·62	83 06	— 0·33	0·87	η Urs. Maj. and Spica	1	— 0·62	Meridian mark steady.
Ditto	"	"	+ 0·12	1·00	Ditto	2	+ 0·71	Tremulous.
Ditto	"	"	+ 0·11	0·49	γ Drac. and μ Sagitt.	3	— 0·35	Good series of transits.
Ditto	"	"	— 0·03	0·90	η Ur. Maj. and β′ Scorp.	3	— 0·64	Good trans. S. of zenith.
7 Scorpii . . . δ	15 51 28·34	112 11	+ 0·40	1·00	η Urs. Maj. and Spica	1	+ 1·04	The suggested errors bold.
8 Scorpii . . . β′	15 56 43·37	109 23	+ 0 03	0·90	η Ur. Maj. and α² Lib.	2	— 0·90	Good night S. of zenith.
1 Ophiuchi . . . δ	16 06 29·03	93 18	— 0·15	0·90	η Ur. Maj. and β′ Scorp.	3	— 0·74	Safe S. of zenith.
20 Scorpii . . . σ	16 12 04·58	115 14	+ 0·11	0·87	η Urs. Maj. and Spica	1	— 0·93	Too great a proportion of low stars.
21 Scorpii *N.A.* . α	16 20 13·21	116 05	+ 0·27	0·87	η Urs. Maj. and Spica	1	— 0·95	Meridian marks steady.
23 Scorpii . . . τ	16 26 33·18	117 54	— 0·32	0·61	η Urs. Maj. and Spica	2	+ 0·66	Level unusually out.
Ditto	"	"	+ 0·27	0·87	Ditto	3	— 0·97	Meridian marks steady.
25 Scorpii . P. 170	16 37 41·13	115 15	— 0·47	0·61	η Urs. Maj. and Spica	3	+ 0·64	An initiatory night.
42 Ophiuchi . . . θ	17 12 47·98	114 52	+ 0·27	1·23	Mean of 7th and 9th	2	— 1·32	No low Greenʰ star.
23 Draconis . . . β	17 27 02·39	37 35	— 0·42	1·30	η Ur. Maj. and δ Aqui.	0	— 0·03	Nearly all Greenw. stars.

OBSERVATIONS.									
Date.	Star's name.	Telescope wires.					Mean Transit.	Clock's		Remarks.
		I.	II.	Centre.	IV.	V.		Error.	Daily rate.	
		secs.	secs.	h. m. s.	secs.	secs.	s.	s.	s.	
1839 5 July	60 Ophiuchi *comp.* . . β	54·2	13·0	17 35 31·8	50·6	9·4	31·80	— 2·28	— 0·12	Rate with a Serp. 7 days after.
1838 11 May	3 Sagittarii *comp.* . . p	54·0	15·0	17 37 36·0	57·0	18·0	36·00	+ 11·81	— 0·82	Pretty steady. Rate with Antares the day before.
8 June	Ditto	12·9	33·0	17 36 54·4	15·5	36·0	54·36	— 30·45	— 2·15	Rate by Antares previous day.
11 May	33 Drac. *N. A.* . γ	5·5	35·0	17 53 5·0	35·0	4·7	5·04	+ 12·03	— 1·02	Zen. time. Rate by Capella.
31 Aug.	Ditto	2·7	32·6	17 53 2·6	32·5	2·3	2·54	+ 9·96	— 1·94	Rate by β Drac. previous day.
1839 5 July	13 Sagittarii *N. A.* μ'	29·5	49·5	18 04 . .	29·5	49·5	9·50	— 2·32	+ 0·06	Assumed. Rate with a^2 Lib. 4 days before.
1838 8 June	19 Sagittarii *comp.* . δ	27·0	48·3	18 10 9·8	31·2	52·7	9·80	— 30·54	— 2·24	Rate by Antares previous day.
27 Sept.	3 Lyræ *N. A.* . . . a	. .	. .	18 31 39·5	3·2	27·0	39·47	+ 10·87	— 2·12	Rate with a Cor. next day.
25 Nov.	Ditto	. .	15·9	18 31 39·6	3·4	27·0	39·58	+ 12·16	— 1·17	Clear and steady. Rate with itself next day.
26 „	Ditto	50·9	14·7	18 31 38·3	2·1	26·0	38·40	— 10·99	— 1·17	Clear and steady. Rate of Fomal. 3 days after.
1839 15 July	Ditto	41·3	5·0	18 31 29·0	52·5	17·0	28·96	— 3·06	— 0·17	Rate with Capella 3 days previous.
1838 8 June	27 Sagittarii *comp.* . ϕ	22·7	43·6	18 35 4·3	25·0	46·0	4·32	— 30·59	— 2·29	Rate by Antares previous day.
27 Sept.	Ditto	. .	24·4	18 35 45·1	5·8	26·5	45·10	+ 10·23	— 2·44	Tremulous. Rate with δ Aqui. next day.
3 Oct.	10 Lyræ *N. A.* . . β	. .	. .	18 44 4·8	27·0	49·0	4·72	— 2·86	— 2·08	Rate with γ Aqui. 3 days before.
30 Aug.	34 Sagittarii *calc.* .	45·6	6·5	18 45 27·2	48·0	8·8	27·22	+ 10·81	— 1·75	Horizon thick. Rate with β Ophiu. 10 days previous.
31 „	Ditto	43·0	3·8	18 45 24·7	45·5	6·4	24·68	+ 8·29	— 2·52	Bad figure. Rate with itself previous day.
27 Sept.	Ditto	44·0	5·0	18 45 25·8	46·5	7·2	25·70	+ 9·73	— 2·23	Very trem[s]. Rate with γ Capr. 3 days after.
27 Sept.	14 Lyræ *calc.* . . γ	. .	43·5	18 53 5·6	27·8	50·0	5·55	+ 10·19	— 2·17	Rate with β Lyræ 6 days after.
26 Oct.	Ditto	15·6	37·4	18 52 59·5	21·6	43·6	59·54	+ 5·39	— 2·29	Comp. by 1112 Cat. Rate with γ Cyg. 2 days before.
30 Aug.	40 Sagittarii *calc.* . τ	21·4	42·2	18 57 3·2	24·5	45·7	3·40	+ 10·55	— 2·39	Faint. Rate with itself next day.
31 „	Ditto	19·0	40·0	18 57 1·0	22·0	43·0	1·00	+ 8·16	— 1·91	Good coincidence. Rate with μ' Sagitt 3 days after.
27 Sept.	17 Aquilæ *N. A.* . ζ	32·0	51·0	18 58 10·2	29·3	. .	10·00	+ 10·12	— 2·16	Rate with β Lyræ 6 days after.
26 Oct.	Ditto	25·9	45·0	18 58 4·2	23·4	42·6	4·22	+ 4·64	— 2·08	Rate with a Aqui. 2 days before.
1839 4 July	Ditto	22·9	42·0	18 58 1·0	20·0	39·1	1·00	— 2·63	+ 0·01	Rate with δ Aqui. the previous day.

DEDUCTIONS.

Star's name.	AR. 1 Jan. 1850.	Approx. P.D.	Δ Ast. C.	Daily Azim. Dev. E.	Stars compared for daily Azim.	Wt.	Az. correction.	Remarks.
	h. m. s.	° ′	s.	s.			s.	
60 Ophiuchi . . . β	17 36 03·62	85 22	+0·26	0·40	γ Drac. and α Ophiu.	2	−0·29	Tolerable night.
3 Sagittarii . . . ν	17 38 06·86	117 46	+0·25	0 61	η Urs. Maj. and Spica	2	+0·66	Irregular series.
Ditto	,,	,,	+0·10	1·23	Mean of 7th and 9th	2	−1·36	No low Greenwich star.
33 Draconis . . . γ	17 53 07·15	38 29	−0·18	0·61	η Urs. Maj. and Spica	0	0	Too near the zenith.
Ditto	,,	,,	+0·17	1·36	β Drac. and μ Sagitt.	0	0	A zenith star.
13 Sagittarii . . . μ′	18 04 47·28	111 06	+0·33	0·40	γ Drac. and α Ophiu.	0	−0·40	Tolerable. This star agrees best with ε Boot.
19 Sagittarii . . δ	18 11 23·13	119 54	+0·09	1·23	Mean of 7th and 9th	3	−1·40	Troublesome night.
3 Lyræ . . . . α	18 31 50·97	51 21	+0·21	1·18	Mean, stars too close	1	+0·35	Greenw. stars too close.
Ditto	,,	,,	+0·32	0·50	α Cyg. and Fomal.	0	+0·15	Short but good night.
Ditto	,,	,,	+0·33	0·31	γ Drac. and Fomal.	1	+0·09	Transits irregular.
Ditto	,,	,,	−0·03	0·49	γ Drac. and μ Sagitt.	3	−0 15	No perceptible collimation error.
27 Sagittarii . . . φ	18 36 17·30	117 08	+0 01	1·23	Mean of 7th and 9th	1	−1·35	Tried several stars for deviation in Azim.
Ditto	,,	,,	+0·36	1·18	Mean, stars too close	1	+1·30	Greenw. stars too close.
10 Lyræ . . . . β	18 44 32·01	56 49	−0·03	1·00	α Lyræ and mean	2	−0·38	The Greenwich stars too near each other in P.D. this night.
34 Sagittarii . . . σ	18 45 57·73	116 29	+0·32	1·18	β Drac. and β Ophiu.	3	+1·20	Very few stars observed, cloudy. No perceptible error of collimation.
Ditto	,,	,,	+0 04	1·36	β Drac. and μ′ Sagitt.	3	+1·48	Level was applied.
Ditto	,,	,,	+0·03	1·18	α Lyræ and mean	1	+1·29	Level error W. + 0·57.
14 Lyræ . . . . γ	18 53 19·34	57 31	−0·32	1·18	Mean of 27th and 28th inst.	0	+0·47	Stars tremulous.
Ditto	,,	,,	+1·22	1·25	α Aqui. and mean	0	+0·50	Epps made the Azim. dev. 1s·35, but does not say how.
40 Sagittarii *calc.* . τ	18 57 34·12	117 53	+0·14	1·18	β Drac. and β Ophiu.	3	+1·28	Returned the Axis.
Ditto	,,	,,	−0·05	1·36	β Drac. and μ′ Sagit.	2	+1·51	Changeable night.
17 Aquilæ . . . ζ	18 58 30·44	76 21	−0·10	1·18	α Aqui. and β Aqui. balanced.	3	+0·75	Azim. dev. difficult.
Ditto	,,	,,	+0·14	1·25	α Aqui. and mean	2	+0·79	Tried several eye-pieces.
Ditto	,,	,,	−0·12	0·63	α Cyg. and α² Capric.	2	−0·40	Collimation too little to correct for.

OBSERVATIONS.

Date.	Star's name.	Telescope wires. I.	II.	Centre.	IV.	V.	Mean Transit.	Clock's Error.	Daily rate.	Remarks.
		secs.	secs.	h. m. s.	secs.	secs.	s.	s.	s.	
1838 31 Aug.	57 Draconis *calc.* . δ	4·8	53 0	19 12 41·4	29·8	18·0	41·40	+ 9·81	— 1·96	AR. from 1112 Cat. Rate with γ Draconis 3 days after.
28 Sept.	Ditto	2·0	50·5	19 12 38·5	27·0	15·0	38·60	+ 9·10	— 2·62	Very tremulous. Rate with α Ceph. 2 days after.
26 Oct.	Ditto	57·0	45·5	19 12 33·7	22·0	10·5	33·74	+ 5·88	— 2·26	Rate with γ Drac. 4 days after.
1839 4 July	Ditto	. .	42·0	19 12 30·2	19·0	7·0	30·07	— 2·32	— 0·14	Rate with α Urs. Maj. 9 days after.
1838 31 Aug.	30 Aquilæ *N. A.* . δ	54·3	13·0	19 17 31·5	50·0	8·5	31·46	+ 8·97	— 2·05	Rate with ζ Aqui. 8 days before
26 Oct.	Ditto	48·8	7·5	19 17 26·2	44·8	3·5	26·16	+ 4·49	— 2·24	Rate with itself 6 days before.
27 Sept.	52 Sagittarii *calc.* . h^2	22·5	43·0	19 27 3·5	24·0	44·5	3·50	+ 9·71	— 2·21	Rate with μ' Sagittar. 7 days before.
27 Sept.	50 Aquilæ *N. A.* . γ	8·0	27·0	19 38 46·0	4·9	23·9	45·98	+ 10·06	— 2·15	Rate with itself 6 days before.
28 „	Ditto	6 0	24·8	19 38 43·8	. .	21·0	43·62	+ 7·72	— 2·34	Cloudy. Rate with itself yesterday.
30 „	Ditto	1·6	24·4	19 38 39·2	58·0	17·0	39·24	+ 3·37	— 2·18	Rate with itself 2 days before.
26 Oct.	Ditto	2·3	21·1	19 38 40·0	59·0	17·8	40·04	+ 4·60	— 2 26	Rate with itself 6 days before.
26 Nov.	Ditto	7·7	26·5	19 38 45·3	4·3	23·0	45·36	+ 10·29	— 1·13	Rate with itself yesterday.
1839 4 July	Ditto	58·4	. .	19 38 36·2	. .	14·0	36·20	— 3·10	— 0·02	Rate with β Libræ 11 days after.
1838 31 Aug.	53 Aquilæ *N. A.* . α	26·7	45·5	19 43 4·3	23·1	42·0	4·32	+ 8·73	— 2·19	Rate with β Ophiu. 3 days after.
27 Sept.	Ditto	27·2	46·1	19 43 5·0	24·0	42 8	5·02	+ 9·77	— 2·20	Rate with itself 6 days before.
28 „	Ditto	. .	44·0	19 43 3·0	. .	40·7	2·98	+ 7·74	— 2·03	Cloudy. Rate with itself yesterday.
30 Sept.	Ditto	21·0	39·9	19 42 58·8	17·6	36·4	58·74	+ 3·53	— 2·20	Cloudy. Rate with itself 2 days before.
24 Oct.	Ditto	26·2	44·8	19 43 3·6	22·3	41·2	3·62	+ 8·80	— 2·28	Cloudy. Rate with itself 4 days previous.
25 Nov.	Ditto	28·2	47·0	19 43 5·8	24·5	43·1	5·72	+ 11·29	— 1·07	Steady. Rate with itself next day.
26 „	Ditto	27·0	45·8	19 43 4·7	23·5	42·2	4·64	+ 10·22	— 1·68	Rate with itself 12 days after.
1839 4 July	Ditto	18·0	37·0	19 42 55·5	15·0	33·0	55·70	— 2·96	+ 0·68	Rate with β Ophiu. next day.
1838 31 Aug.	60 Aquilæ *N. A.* . β	55·6	14·2	19 47 32·8	51·4	10·2	32·84	+ 8·59	— 2·15	Rate with β Ophiu. 3 days after.
24 Oct.	Ditto	54·8	13·4	19 47 32·0	50·8	9·5	32·10	+ 8·60	— 2·30	Cloudy. Rate with itself 4 days before.
26 „	Ditto	50·6	9·2	19 47 27·9	46·5	5·2	27·88	+ 4·40	— 2·10	Rate with itself 2 days before.
1839 4 July	Ditto	47·0	5·5	19 47 24·0	43·0	2·0	24·30	— 3·01	+ 0·73	Rate with β Ophiu. next day.

DEDUCTIONS.

Star's name.	AR. 1 Jan. 1850.	Approx. P.D.	Δ Ast. C.	Daily Azim. Dev. E.	Stars compared for daily Azim.	Wt.	Az. correction.	Remarks.
	h. m. s.	° ′	s.	s.			s.	
57 Draconis . . . δ	19 12 29·56	22 36	− 0·82	1·36	β Drac and μ′ Sag.	3	− 0·95	Level error E. 0·97.
Ditto	”	”	− 0·39	1·30	δ Drac. and δ Aqui.	3	− 0·97	The only unknown star to-night.
Ditto	”	”	− 0·30	1·25	α Aqui. and mean.	3	− 0·88	Observed Encke's comet also.
Ditto	”	”	− 0·66	0·63	α Cyg. and α Capric.	3	+ 0·44	Shifted the axis E. to W.
30 Aquilæ . . . δ	19 17 55·46	87 11	+ 0·31	1·36	β Drac. and μ Sagitt.	1	+ 1·02	Observed 82 Urs. min.
Ditto	”	”	+ 0·12	1·25	α Aqui. and mean.	1	+ 0·94	Regulated chronometers.
52 Sagittarii . . h^2	19 27 34·13	115 13	+ 0·06	1·18	Mean of 27th and 28th inst.	3	+ 1·26	Level W. + 0·57.
50 Aquilæ . . .	19 39 07·57	76 45	− 0·07	1·18	α Ly. and β Aqui. bald. 28th	3	+ 0·78	N. A. differs from A.S.C. which gives AR. less by ·13.
Ditto	”	”	− 0·14	1·30	η U. Maj. and δ Aqui.	2	+ 0·83	Transits very irregular.
Ditto	”	”	+ 0·14	0·44	α Ceph. and β Aqua.	2	+ 0·29	From P.D. 97° to 107° clock err. too small.
Ditto	”	”	+ 0·06	1·25	α Aqui. and mean	2	+ 0·86	Obsd. from P.D. 22° to 115°, but results very irregular.
Ditto	”	”	− 0·22	0·31	γ Drac. and Fomalt	1	+ 0·19	Clock-errors very irreg. to-night.
Ditto	”	”	− 0·60	0·63	α Cyg. and $α^2$ Capric.	0	− 0·40	Obsd. by Mr. Mann this night.
53 Aquilæ . . . α	19 43 27·67*	81 32	+ 0·03	1·36	β Drac. and μ′ Sag.	2	+ 0·95	Bad figure.
Ditto	”	”	− 0·30	1·18	α Lyr. and β Aqui. and 28th	1	+ 0·83	α Aqui. gave more Azim. dev.
Ditto	”	”	− 0·03	1·30	δ Drac. and δ Aqui.	3	+ 0·50	Though many Gr. stars, results irregular.
Ditto	”	”	+ 0·34	0·44	α Ceph. and β Aqua.	2	+ 0·32	Results irregular.
Ditto	”	”	+ 0·11	1·30	α Cyg. and $α^2$ Capric.	3	+ 0·91	Only one unknown star.
Ditto	”	”	− 0·19	0·50	α Cyg. and Fomalt.	2	+ 0·35	Good series to-night.
Ditto	”	”	− 0·27	0·31	γ Drac. and Fomalt.	1	+ 0·21	Long but irreg. series.
Ditto	”	”	− 0·42	0·63	α Cyg. and $α^2$ Capric.	0	− 0·44	Obs. by Mr. Mann.
60 Aquilæ . . . β	19 47 56·54	83 59	− 0·08	1·36	β Drac. and μ Sagitt.	2	+ 0·98	Tolerably regular.
Ditto	”	”	− 0·07	1·30	α Cyg. and α Capric.	3	+ 0·94	Only 5 transits to-night.
Ditto	”	”	− 0·05	1·25	α Aqui. and mean	3	+ 0·90	Az. dev. by Epps 1·35.
Ditto	”	”	− 0·46	0·63	α Cyg. and $α^2$ Capric.	0	− 0·45	Eye-piece changed.

OBSERVATIONS.

Date.	Star's name.	Telescope wires. I.	II.	Centre.	IV.	V.	Mean Transit.	Clock's Error.	Clock's Daily rate.	Remarks.
		secs.	secs.	h. m. s.	secs.	secs.	s.	s.	s.	
1838 31 Aug.	62 Sagittarii *calc.* . *c*	11·1	32·2	19 52 53·2	14·3	35·5	53·26	+ 08·26	— 1·95	Hazy. Rate with μ' Sagitt. 3 days after.
27 Sept.	Ditto	12·2	33·0	19 52 54·1	15·1	36·0	54·08	+ 09·42	— 2·02	Rate with γ Aqui. 3 days after.
1839 4 July	65 Aquilæ *calc.* . . θ	23·0	. .	20 02 59·8	17·8	37·1	59·97	— 02·75	+ 0·47	Rate with β Ophiu. next day.
1838 25 Nov.	6 Capricorni *N. A.* a^2	39·0	58·0	20 09 17·0	. .	. .	17·08	+ 11·15	— 1·80	Rate with β Ceti 11 days after.
26 „	Ditto . . a^1	14·2	32·5	20 08 51·8	11·0	30·2	51·94	+ 10·00	— 1·72	Rate with ϵ Orionis 7 days after.
1839 4 July	9 Capricorni *calc.* σ^2	. .	39·0	20 11 58·3	17·4	37·0	58·23	— 02·53	+ 0·25	Rate with β Ophiu. next day.
1838 24 Oct.	37 Cygni *calc* . . γ	47·5	11·6	20 16 35·8	. .	24·3	35·84	+ 09·97	— 2·26	Rate with a Cyg. 5 days after.
1839 4 July	Ditto	39·4	3·0	20 16 27·6	52·0	16·0	27·60	— 01·63	— 0·48	Rate with γ Boot. next day.
1838 1 Nov.	50 Cygni *N. A.* . a	56·0	22·0	20 35 48·2	14·4	40·6	48·24	— 07·64	— 2·20	Glaring figure. Rate with γ Cyg. 8 days before.
26 Oct.	16 Capricorni *calc.* ψ	55·3	16·0	20 36 36·6	57·2	17·8	36·58	+ 03·73	— 2·32	Rate with a^2 Capric. 6 days before.
1839 4 July	53 Cygni *calc.* . . ϵ	57·8	19·8	20 39 42·0	4·6	26·5	42·14	— 01·70	— 0·41	Rate with γ Boot. next day.
1838 26 Oct.	34 Capricorni *calc.* . ζ	50·8	11·0	21 17 31·2	51·5	11·8	31·26	+ 03·59	— 2·00	Rate with a^2 Capric. 6 days before.
30 Sept.	40 Capricorni *calc.* γ	34·0	53·5	21 31 13·0	32·6	51·8	12·98	+ 03·04	— 2·09	Rate by a^2 Capric. 3 days before.
26 Oct.	Ditto	34·6	54·0	21 31 13·5	33·0	52·5	13·52	+ 03·92	— 2·28	Rate with a^2 Capric. 6 days before.
29 Oct.	8 Pegasi *N. A.* . ϵ	36·8	55·5	21 36 14·2	33·0	51·8	14·26	— 02·16	— 2·19	Rate with a Aqui. 5 days before.
30 Sept.	49 Capricorni *calc.* . δ	33·5	52·7	21 38 12·1	31·5	50·9	12·14	+ 03·23	— 2·35	Rate with a^2 Capric. 12 days after.
24 Nov.	Ditto	41·8	1·2	21 38 20·6	40·0	59·3	20·58	+ 12·36	— 1·52	Rate with a^2 Capric. 12 days before.
24 Nov.	51 Capricorni *calc.* μ	4·0	23·2	21 44 42·4	1·5	20·8	42·38	+ 12·81	— 1·45	Rate with a^2 Capric. 12 days before.
30 Sept.	34 Aquarii *N. A.* . a	57·0	15·5	21 57 34·0	52·6	11·2	34·06	+ 03·11	— 2·37	Rate with itself 12 days after.
29 Oct.	Ditto	51·0	9·7	21 57 28·2	46·7	5·2	28·16	— 02·58	— 2·24	Rate with β Aqui. 5 days before.
3 Sept.	33 Aquarii *calc.* . ι	18·0	27·0	21 57 46·2	5·6	24·8	46·32	+ 01·85	— 2·06	White clouds. Rate with μ' Sag. 7 days after.
24 Nov.	Ditto	17·6	36·6	21 57 55·8	15·1	34·3	55·88	+ 12·16	— 1·53	Rate with a^2 Capric. 12 days before.
3 Sept.	57 Aquarii *calc.* . σ	31·8	50·8	22 22 9·7	28·5	47·3	9·62	+ 01·91	— 2·08	White clouds. Rate with μ' Sag. 7 days after.

	July								August							
	Sun				Twilight.				Sun				Twilight			
	Rise		Set.		Beg.		End		Rise		Set.		Beg.		End	
	ho.	m	ho.	m	ho.	m	ho	m	ho.	m	ho.	m.	ho.	m.	ho.	m
1	3	45	8	15	No need Night				4	18	7	42	1	23	10	37
2	3	46	8	14					4	20	7	40	1	27	10	33
3	3	47	8	13					4	22	7	38	1	31	10	29
4	3	47	8	13					4	24	7	36	1	35	10	25
5	3	48	8	12					4	25	7	35	1	38	10	22
6	3	48	8	12					4	27	7	33	1	42	10	18
7	3	49	8	11					4	29	7	31	1	46	10	14
8	3	50	8	10					4	30	7	30	1	50	10	10
9	3	51	8	9					4	32	7	28	1	53	10	7
10	3	52	8	8					4	34	7	26	1	57	10	3
11	3	52	8	8					4	35	7	25	2	0	10	0
12	3	53	8	7					4	37	7	23	2	4	9	56
13	3	54	8	6					4	39	7	21	2	7	9	53
14	3	55	8	5					4	41	7	19	2	10	9	50
15	3	56	8	4					4	42	7	18	2	14	9	46
16	3	57	8	3					4	44	7	16	2	17	9	43
17	3	58	8	2					4	46	7	14	2	20	9	40
18	4	0	8	0					4	48	7	12	2	24	9	36
19	4	1	7	59					4	50	7	10	2	27	9	33
20	4	2	7	58					4	51	7	9	2	30	9	30
21	4	3	7	57					4	53	7	7	2	33	9	27
22	4	5	7	55	0	21	11	39	4	55	7	5	2	37	9	23
23	4	6	7	54	0	31	11	29	4	57	7	3	2	40	9	20
24	4	7	7	53	0	39	11	21	4	59	7	1	2	43	9	17
25	4	8	7	52	0	47	11	13	5	0	7	0	2	46	9	14
26	4	10	7	50	0	56	11	4	5	2	6	58	2	49	9	11
27	4	11	7	49	1	3	10	57	5	4	6	56	2	52	9	8
28	4	13	7	47	1	9	10	51	5	6	6	54	2	55	9	5
29	4	14	7	46	1	14	10	46	5	8	6	52	2	57	9	3
30	4	16	7	44	1	17	10	43	5	10	6	50	3	0	9	0
31	4	17	7	43	1	20	10	40	5	12	6	48	3	3	8	57

DEDUCTIONS.

Star's name.	AR. 1 Jan. 1850.	Approx. P.D.	Δ Ast. S. C.	Daily Azim. Dev. E.	Stars compared for daily Azim.	Wt.	Az. correction.	Remarks.
	h. m. s.	° ′	s.	s.			s.	
62 Sagittarii . . . c	19 53 25·42	118 07	+ 0·12	1·36	β Drac. and μ′ Sagit.	2	+ 1·51	Tried various deviations.
Ditto	"	"	− 0·10	1·18	α Lyræ and β Aqui. balanced 28th.	2	+ 1·32	Very irregular results.
65 Aquilæ . . . θ	20 03 33·69	91 16	− 0·15	0·63	α Cyg. and α′ Capric.	1	− 0·50	Observed by Dr. Lee.
6 Capricorni . . α²	20 09 43·60	103 00	− 0·17	0·50	α Cyg. and Fomalt.	2	+ 0·47	Good series to-night.
Ditto . . α¹	"	"	− 0·40	0·31	γ Drac. and Fomalt.	1	+ 0·28	An irregular night, but + 10·70, mean err. by 7 Gr. stars.
9 Capricorni . . β²	20 12 34·54	105 16	+ 0·17	0·63	α Cyg. and α² Capric.	1	− 0·60	Observed by Dr. Lee.
37 Cygni . . . . γ	20 16 50·26	50 14	+ 0·77	1·30	α Cyg. and α² Capric.	0	+ 0·37	The only unknown star.
Ditto	"	"	+ 0·64	0·63	Ditto	0	− 0·17	Observed by Mr. Mann.
50 Cygni . . . . α	20 36 18·69	45 15	− 0·03	1·35	α Pers. and α Capric.	2	− 0·23	Disagreed with its neighbours. Level W. 0″·05.
16 Capricorni . . ψ	20 37 12·88	115 48	− 0·24	1·25	α Aqui. and mean	2	+ 0·69	Disagreed with ζ Capric.
53 Cygni . . . . ε	20 40 07·59	56 36	+ 0·64	0·63	α Cyg. and α Capric.	0	− 0·24	Observed by Dr. Lee.
34 Capricorni . . ζ	21 18 05·34	113 03	− 0·48	1·25	α Aqui. and mean.	3	+ 0·66	Disagreed with ψ Capric.
40 Capricorni . . γ	21 31 46·06	107 20	+ 0·14	0·44	α Ceph. and β Aqua.	1	+ 0·44	Unsteady night.
Ditto	"	"	− 0·19	1·25	α Aqui. and mean.	2	+ 0·61	Trustworthy observations
8 Pegasi . . . ε	21 36 48·94	80 59	+ 0·09	1·28	α Cyg. and α Capric.	2	− 0·86	Good regular night.
49 Capricorni . . δ	21 38 44·89	106 48	+ 0·33	0·44	α Ceph. and β Aqua.	1	− 1·44	Merid. pos. same as yesterday.
Ditto	"	"	− 0·11	0·12	γ Ceph. and Fomal.	2	+ 0·24	Position of object glass rectified.
51 Capricorni . . μ	21 45 05·92	104 15	+ 0·34	0·12	γ Ceph. and Fomal.	1	+ 0·11	Level E. 0″·50. No app. collim.
34 Aquarii . . . α	21 58 04·52	91 02	+ 0·14	0·44	α Ceph. and β Aqua.	3	+ 0·36	Disagrees with its neighbours.
Ditto	"	"	− 0·34	1·28	α Cyg. and α Capric.	1	− 1·02	Not in accordance with the rest to-night.
33 Aquarii . . . ι	21 58 19·93	104 35	− 0·18	1·00	Mean and μ′ Sagit.	2	+ 0·95	Stars tremulous.
Ditto	"	"	− 0·29	0·12	γ Ceph. and Fomal.	0	+ 0·12	Position of instrument good.
57 Aquarii . . . σ	22 22 42·38	101 26	− 0·04	1·00	Mean and μ′ Sagit.	2	+ 0·92	Level E. 0″·88.

OBSERVATIONS.

Date.	Star's name.	Telescope wires.					Mean Transit.	Clock's		Remarks.
		I.	II.	Centre.	IV.	V.		Error.	Daily rate.	
		secs.	secs.	h. m. s.	secs.	secs.	s.	s.	s.	
1838 24 Nov.	42 Pegasi *N. A.* . ζ	0·2	19·0	22 33 38·0	57·0	16·0	38·04	+ 12·40	— 1·52	Rate with ε Peg. 12 days before.
3 Sept.	73 Aquarii *calc.* . λ	37·5	56·3	22 44 15·0	33·8	52·5	15·02	+ 2·11	— 2·15	Rate with α Serp. 8 days before.
24 Nov.	Ditto	47·0	5·8	22 44 24·5	43·3	2·0	24·52	+ 11·92	— 1·55	Rate with α^2 Capric. 12 days before.
25 Nov.	Ditto	46·0	4·8	22 44 23·5	42·2	1·0	23·50	+ 10·98	— 0·94	Very tremulous. Rate with itself previous day.
24 Nov.	54 Pegasi *N. A.* . α	19·0	38·0	22 56 57·0	16·2	35·5	57·14	+ 12·66	— 1·34	Rate with itself next day.
25 „	Ditto	17·3	36·6	22 56 55·8	15·0	34·2	55·78	+ 11·32	— 1·03	Clear. Rate with γ Aqui. next day.
3 Sept.	90 Aquarii *calc.* . φ	23·5	42·2	23 6 1·0	19·8	38·5	1·00	+ 1·67	— 2·61	Very tremulous. Rate with itself next day.
29 Oct.	Ditto	19·0	37·8	23 5 56·5	15·1	33·9	56·46	— 2·82	— 2·37	Rate with δ Aqui. 3 days before.
3 Sept.	Piscium *calc.* . . χ	6·0	24·5	23 18 43·0	1·5	20·0	43·00	+ 1·94	— 2·22	Bad. A double star. Rate with β Aqui. 3 days before.
25 Nov.	20 Piscium ☽ . . n	13 6	32·2	23 39 50·8	9·5	28·0	50·82	+ 11·25	— 0·85	Very hazy. Rate with itself next day.
26 „	Ditto	12·6	31·4	23 39 50·0	8·6	27·2	49·96	+ 10·40	— 1·28	Rate with α Aqua. 3 days after.
29 Oct.	29 Piscium *calc.* . q	55·0	13·6	23 53 32·2	50·8	9·5	32·22	— 2·71	— 2·40	Rate with δ Aqui. 3 days before.
26 Nov.	Ditto	6·8	25·5	23 53 44·1	2·8	21·4	44·12	+ 9·40	— 0·94	Rate with ~~α Aqua.~~ 3 days after.

DEDUCTIONS.

Star's name.		AR. 1 Jan. 1850.	Approx. P.D.	Δ Ast. S. C.	Daily Azim. Dev. E	Stars compared for daily Azim.	Wt.	Az. correction.	Remarks.
		h. m. s.	° ′	s.	s.			s.	
42 Pegasi	ζ	22 33 58·56	79 57	−0·05	0·12	γ Ceph. and Fomal.	1	+0·87	Position of instrument good.
73 Aquarii	λ	22 44 46·79	98 23	+0·13	1·00	Mean and μ′ Sagit.	1	+0·87	White clouds.
Ditto		,,	,,	−0·50	0·12	γ Ceph. and Fomal.	2	+0·10	Level and collimation good.
Ditto		,,	,,	−0·24	0·50	α Cyg. and Fomal.	0	+0·44	Meridional position continues good.
54 Pegasi	α	22 57 17·21	75 36	+0·22	0·12	γ Ceph. and Fomal.	1	+0·07	Sky clouding over.
Ditto		,,	,,	−0·04	0·50	α Cyg. and Fomal.	3	+0·32	Position of object-glass rectified.
90 Aquarii	φ	23 6 32·85	96 52	−0·14	1·00	Mean and μ′ Sagit.	1	+0·86	Level E. + 0″·88.
Ditto		,,	,,	−0·39	1·28	α Cyg. and α Capric.	0	−1·10	Returned to eye-piece 3.
Piscium	χ′	23 19 13·61	89 34	+0·21	1·00	Mean and μ Sagit.	0	+0·78	Uncertain sky.
20 Piscium	n	23 40 13·30	93 36	+0·03	0·50	α Cyg. and Fomal.	2	+0·42	By NA. 23, 39, 39·56.
Ditto		,,	,,	+0·15	0·31	γ Drac. and Fomal.	2	+0·25	Thermometer in observatory 35°.
29 Piscium	q	23 54 7·39	93 52	−0·25	1·28	α Cyg. and α Capric.	1	−1·06	Encke's comet observed.
Ditto		,,	,,	−0·85	0·31	γ Drac. and Fomal.	2	+0·25	Clock vibrating 17·5 each side, in summer = 20·0.

§ 5. THE DOUBLE-STARS MEASURED AT HARTWELL BY CAPTAIN SMYTH.

In my Cycle of Celestial Objects (vol. i. pp. 285—304), I have given a condensed view of the highly interesting department of Compound Stars, which work can be referred to by many: but as it will not be accessible to all who may honour these pages, a prefatory word or two may be considered necessary towards their comprehending the glimpse which will be afforded of the wondrous works of the OMNIPOTENT FIAT.—

> Then speak thy humblest thanks; that thus 'tis giv'n
> To thee (a worm, a mite, an atom! plac'd
> On this small Earthly Ball, to th'universe
> Like dust of balance, or the bucket's drop,)
> To read, to trace, to know HIS glorious works.

It will be recollected that a dark and silent void space extends above, below, and around our system, which has been successfully pierced by the force of genius and art: this, indeed, is the triumph of Man's intellect, for the abyss is so inconceivably vast as absolutely to stun contemplation, the distance to the nearest star *(α Centauri)* being estimated at not less than twenty-one million millions of miles. But the void which thus awfully separates us from the sidereal heavens is known to expand towards other bodies in such a ratio, that the distance of *α Centauri* is comparatively small; and imagination is confounded, even with the facts demonstrated. Among the assemblage of stars which deck the heavens, in numbers so vast as to be absolutely infinite, many individuals appear as single objects to the naked eye, which are found really to consist of two, or more, under some of the finest and most delicate forms of vision conceivable. Most of these, from their enormous distance, appear to be so close to one another, that it requires telescopes of great perfection to separate them. The practical astronomy of these

elegant objects originated in the unprecedented labours of the elder Herschel at Slough, and constituted one of his greatest bequests to science. When he commenced the inquiry, the circumstance of a star being double was readily accounted for, by supposing one star to be situated at an immense distance beyond the other; and therefore it was presumed to be only optically double, or the two components so nearly in a line with our eye as scarcely to subtend a perceptible angle, yet without any real proximity between them. It was owing to his sagacious perseverance, especially as regarded the observations of that beautiful double-star Castor, on an interval of twenty-five years (1778 to 1803), that the relative places of the components were ascertained to vary; and that the changes detected had no relation to the orbital position of the Earth. In the course of the scrutiny which he prosecuted, it was proved that in various cases the stars were physically binary, and that the companion must actually revolve about its primary. Thus the wonderful truth opened to view, that two suns, each self-luminous and probably with an attendant train of planets, were gyrating round their common centre of gravity under the same dynamical laws which govern the solar system: that is, not precisely like our planets round one great luminary, but where each constituent with its accompanying orbs revolves around an intermediate point, or fixed centre. This is a great fact; and one which, in all probability, Newton himself never contemplated.

But in mentioning the persevering sagacity of Sir William Herschel, I must not forget the *palmam qui meruit ferat* axiom: for the merit of having first given a method of determining, from observation, the form of the orbit of a binary star, certainly belongs to M. Savary. It is true that Sir John Herschel, struck with the idea that gravitation must be the law of motion in those distant regions, recommended constant observation upon ξ Ursæ Majoris so far back as 1825; but Savary was the first in the field with a set of elements for the same from calculation. These he published in 1830, shewing that the *comes* moved in an ellipse precisely like the planets of our own system, though of a more varied ex-centricity.

The field is peculiarly attractive to the amateur or extra-meridian astronomer, and was therefore invaded from my station at Bedford. Having thus become deeply interested in stellar physics, and therefore anxious to obtain repeated observations of various objects enrolled in my Cycle, it became desirable for me to repair to Hartwell as often as these came into apparition; and it were ungrateful to omit adding, that the observatory was always most obligingly kept in readiness for my immediate and particular service. The measures and re-measures thus obtained with my former instruments are consequently all taken with the same eye, micrometers, and object-glass, and mostly with the same eye-piece power; and the diurnal motion of the earth was eliminated by the same practice in the use of the AR-handle, or the equable movement of the equatorial clock, as manipulated at Bedford. By these means, whatever optical or other bias might obtain, the results are assuredly comparable with each other, in evidence of angular movement and changes of distance, indicated by the operations of different nights and different years.

Some of these re-examinations have already appeared in my Cycle, which was published in 1844; but it is proper to reprint them here, together with those since observed. They are arranged in the manner already explained in that work (vol. i. p. 427, &c.); so that I need only remind the reader who may be unable to make reference to it, that the weights attached to the distances and to the angles of position—as the relative situation of two component stars in respect to the fixed circles of the sphere is termed—depend, according to the observer's judgment, on the number and presumed goodness of the observations. Thus, while 1 indicates an indifferent single measure or mere estimation, 10 is used to express that the astrometer is entirely satisfied with all the conditions of the operation. The last is a weight but too rarely obtainable; still, from having full leisure and a free choice of objects and opportunity, I was generally enabled to give the Hartwell measures high weights. The following is a list of the double-stars thus re-observed.

Stars.		Cycle No.	Position.		Distance.		Epoch.
			∠ in Degrees.	Wt.	Seconds of Space.	Wt.	
38 Piscium		VIII.	237·8	7	4·5	4	1845·91
η Cassiopeæ . . .		XXIX.	95 8	8	9 1	5	1843·19
			101·5	6	8·5	5	1846·73
36 Andromedæ . . .		XXXII.	322·9	9	1·0	4	1843·12
ζ Piscium		XLVII.	63·3	8	23·1	7	1846·89
123 P. I. Piscium . . .		LX.	26·9	9	1·4	4	1843·10
γ Arietis		LXXII.	358·9	8	8·7	6	1849·12
α Piscium		LXXXI.	331·4	8	3·5	7	1846·92
γ Andromedæ . .	AB.	LXXXII.	61·6	9	11·0	9	1843·33
	AC.		120·0	1	0·5	1	———
γ Ceti		CXI.	285·7	8	2·6	5	1843·16
220 P. II. Persei . . .		CXXII.	85·5	9	12·5	7	1843·18
ε Arietis		CXXIII.	199·6	7	0·9	2	1843·18
98 P. III. Eridani . . .		CXXXIV.	235·9	7	6·0	6	1845·81
32 Eridani		CXLVII.	346·5	8	6·6	7	1843·16
80 Tauri		CLXV.	15·2	8	1·8	4	1843·11
58 Persei		CLXVII.	29·8	7	11·8	5	1843·11
2 Camelopardi . . .		CLXX.	307·2	6	1·5	4	1847·21
β Orionis		CXC.	199·6	8	9·6	5	1850·15
λ Orionis		CCXV.	43·0	9	4·5	9	1843·19
26 Aurigæ		CCXX.	267·3	7	11·8	7	1848·10
ζ Orionis		CCXXIII.	149·4	9	2·5	8	1846·16
11 Monocerotis . .	AB.	CCL.	131·6	7	7·4	5	1847·13
	AC.		123·8	6	10·0	4	———
	BC.		102·5	8	2·6	3	———
38 Geminorum . . .		CCLXVIII.	169·6	8	6·0	5	1848·22
			170·2	8	6·0	5	1849·19
301 P. VI. Lyncis . . .		CCLXXIV.	159·4	9	3·0	9	1843·19

Stars.	Cycle No.	Position.		Distance.		Epoch.
		∠ in Degrees.	Wt.	Seconds of Space.	Wt.	
δ Geminorum	CCLXXXIII.	199·8	8	7·5	4	1847·33
α Geminorum . . AB.	CCXCII.	252·3	9	4·9	9	1843·13
AC.		162·6	7	73·0	5	———
AB.		250·4	7	4·7	4	1845·82
AB.		248·1	9	4·9	5	1849·17
ζ Cancri . . . AB.	CCCXV.	355·1	8	1·2	5	1843 11
AC.		147·2	9	5·0	6	———
AB.		345·5	6	1·0	3	1847·28
AC.		147·4	5	5 0	3	———
ϕ^2 Cancri	CCCXX.	213·9	9	4·8	9	1843·19
υ^1 Cancri	CCCXXI.	40·1	9	5·8	8	1843·18
108 P. VIII Hydræ . .	CCCXXVI.	25·7	8	10·4	6	1849·13
ε Hydræ	CCCXXXVIII.	203·2	9	3·6	8	1843·14
17 Hydræ	CCCXLIII.	358·5	8	4·5	5	1849·21
ω Leonis	CCCLVII.	193·0	3	0·3	1	1843·14
γ Leonis	CCCLXXVI.	107·2	9	2·8	9	1843·18
67 P. x. Leonis . . .	CCCLXXIX.	65·3	7	3·5	5	1843·16
ξ Ursæ Majoris . . .	CCCCVI.	143·2	9	2 3	6	1843·16
		136·1	7	2·8	4	1845·75
		132·8	8	3·0	5	1849·18
ι Leonis	CCCCXI.	86·0	8	2·5	4	1843·38
57 Ursæ Majoris . . .	CCCCXVI.	8·3	7	5·5	4	1846·38
2 Comæ Berenicis . .	CCCCXXXIII.	238·5	8	3·6	5	1849·35
γ Virginis	CCCCLVI.	192·8	5	1·9	3	1843·08
		191·6	8	1·9	5	1843·38
		185·4	6	2·1	4	1845·34
		182·9	7	2·6	4	1846·39
		181·9	6	2·6	5	1847·41
		179·5	8	2·8	5	1848·36
		178·6	8	2·9	6	1849·31
		177·0	7	2·9	5	1850·28
35 Comæ Berenicis . .	CCCCLXII.	42·0	2	1·5	1	1843·32
42 Comæ Berenicis . .	CCCCLXXI.	5·0	1	0·3	1	1842·50

Stars.		Cycle No.	Position.		Distance.		Epoch.
			∠ in Degrees.	Wt.	Seconds of Space.	Wt.	
127 P. XIII. Virginis . .		CCCCLXXXVI.	37·9	8	1·7	6	1842·52
ς Bootis		DXVIII.	127·3	9	1·2	6	1842·43
ϵ Bootis		DXX.	322·1	8	2·8	5	1848·54
ξ Bootis		DXXII.	322·9	9	6·9	9	1842·42
39 Bootis		DXXIII.	45·3	7	3·5	5	1847·61
44 Bootis		DXXIX.	235·9	9	3·7	7	1842·58
			236·2	7	4·1	5	1847·45
η Coronæ Borealis . .		DXLI.	151·3	5	0·5	1	1842·58
			188·5	3	0 3	1	1846·09
μ^2 Bootis		DXLIII.	306·1	6	0·8	2	1842·52
δ Serpentis		DXLVII.	196·2	9	2·8	8	1842·35
ς Coronæ Borealis . .		DXLIX.	301·2	9	6·1	9	1842·57
γ Coronæ Borealis . .		DLI.	round.	8	round.	9	1842·58
			295·0	2	0·5	1	1848·37
51 Libræ . . .	AB.	DLVIII.	23·5	8	1·2	5	1842·56
	AB.		24·9	7	1·0	3	1846·49
	AC.		68·1	6	7 0	4	———
σ Coronæ Borealis . .		DXLV.	155·9	9	1·8	5	1843·35
			162·4	9	2 0	5	1846·60
λ Ophiuchi		DLXXVII.	1·4	8	1·1	3	1842·50
ς Herculis		DLXXXIV.	136·9	6	1·2	2	1842·57
			108·5	3	1·0	2	1848 39
η Herculis		DLXXXVI.	150·0	1	0·3	1	1842·53
μ Draconis		DCII.	191·6	6	3·0	2	1847 51
36 Ophiuchi		DCIV.	216·6	8	4·9	8	1842·46
α Herculis		DCV.	118·7	9	4·5	9	1842 57
ρ Herculis		DCXIII.	309·1	7	3·8	5	1847·61
τ Ophiuchi		DCXXX.	227·0	5	0·9	1	1842·52
70 Ophiuchi		DCXXXIII.	122·4	9	6·6	6	1842·55
			119·7	6	6·8	5	1847·48

2 P

Stars.		Cycle No.	Position.		Distance.		Epoch.
			∠ in Degrees.	Wt.	Seconds of Space.	Wt.	
100 Herculis		DCXXXVI.	1·6	8	14·0	5	1850·54
73 Ophiuchi		DCXXXVII.	255·5	9	1·4	6	1842·39
59 Serpentis		DCXLIX.	314·2	9	3·9	9	1842·53
α Lyræ		DCLV	140·3	9	43·4	9	1843·34
ε Lyræ . . .	AB.	DCLXI.	20·6	6	3·2	5	1842·59
	CD.		150·9	8	2·6	5	———
δ Cygni		DCCXIV.	25·6	8	1·8	3	1842·56
ε Draconis		DCCXXVII.	356·3	6	3·0	4	1846·77
26 P. xx. Antinoi . . .		DCCXXXVII.	210·2	6	3·5	3	1847·60
178 P. xx. Delphini . . .		DCCLI.	210·5	2	0·7	1	1842 58
49 Cygni		DCCLIX.	48·3	6	2·7	4	1850·60
λ Cygni . . .	Aa.	DCCLXIII.	130·0	1	0 7	1	1843 74
61 Cygni		DCCLXXVII.	99·8	7	16·4	5	1848·07
β Cephei		DCCLXXXIX.	251·0	9	13·7	9	1843·16
ζ Aquarii		DCCCXIII.	348·9	9	2·7	6	1842·59
			347·7	7	3·3	4	1848 02
306 P. xxii. Pegasi . . .		DCCCXXIX.	145·5	8	8 2	5	1849·80
π Cephei . . .	Aa.	DCCCXXXI.	330·0	1	1·8	1	1843·77
σ Cassiopeæ		DCCCXLIX.	326·4	7	2·9	4	1848·71

§ 6. ON THE COLOURS OF DOUBLE STARS.

In the Cycle of Celestial Objects (vol. i. page 300-4) I have dwelt upon the colours of double stars; and in the Bedford Catalogue, which forms the second volume of that work, I have assigned such colours to all the objects as struck me at the time of observation. It seems that towards the close of the labours of Signior Benedict Sestini, of Rome, on a very extensive catalogue of stars, my book reached his hands, and led him to form the table which he has appended to his volume,* in hopes that the colours of stars may be more strictly watched. The conclusions which he had already arrived at were, that of two thousand five hundred and forty stars (those of Baily's Catalogue observed at Rome) the yellow stars are about half the total number, and equally distributed; the white stars are one-fifth, in scattered portions; and the orange rather more than one-fifth. The red and the blue are rare from the Pole to 30° of north declination; the blue then become numerous ($= \frac{1}{7}$) to the Equator, especially from AR. 18^h to 20^h; and the red abound from 0 to 30 south declination, and AR. 16^h to 20^h.

On Signior Sestini's instituting the comparisons which he has described in his work, he carefully recorded the dates, as a step to ascertaining whether the colours may or may not be found to vary with time. Political furor—a deadly foe to science—drove De Vico, Sestini, and other distinguished members of the Collegio Romano, from their country; and the two former sought and found an asylum in America. In passing through London, De Vico had given me notice of the use to which my Cycle had been applied; and I afterwards received a copy of Sestini's work, with the following letter in English, dated George-town College, March 19th, 1849:—

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* A selection from these, twenty-nine in number, was communicated by the late Professor De Vico to Schumacher at Altona, in 1849; who published the details in No. 684 of the *Astronomische Nachrichten.*

"Soon after I had completed this collection of observations, I conceived the design of sending a copy to you, not only as a mark of respectful esteem, but also for having profited by your Celestial Cycle in the arrangement and comparison of the observations that I myself had made in the observatory of the Roman College. But the unmerited expulsion and exile that I and my brethren have suffered, have obliged me to leave almost every thing, and the printed copies of the little *Memoria* remained in the printer's hands, where I think they are yet. Luckily, a while ago, I found a few copies in a trunk, sent to me after the death of our dear De Vico. Therefore I send you now what I could not send before, and at the same time and without troubling you I would desire to know what you advise upon this sort of observations. And, as I have the same objective glass of Cauchoix that I have used in Rome to collect these observations, I desire to know if you approve a review not entirely but sufficiently general in order to examine if the difference of the climate have any influence on the colour of stars. You can also, if you please, suggest more advisable means than those I have adopted, and I should be very happy if the opportunity of having the same and so good an objective glass that I have used for ten years in Italy could give me the means of lending some advantage to the science: what so sincere a lover of this beautiful science as you are can easily find. On another occasion, and when I become better acquainted with the English language, I hope to thank you for all your favours and kindness. Then also I will tell something of the new observatory of this George-town College, erected and very well furnished by the care of M. Curley, a very able and industrious professor, my colleague.

"The observations made and published with my first *Memoria* are reprinted and collected together with all the others of this second *Memoria*. Nevertheless, if I had here a copy, I would join to the second, and I would send both to you."

In reply to Signior Sestini, I expressed my satisfaction with the course of his inquiries, as they might yet be of great value in a very interesting branch of physical phenomena. He should, however, remember that the colours I had recorded were frequently noted after the eye was fatigued and biassed by previous working in an illuminated field, and reading minute divisions on graduated micrometer-circles. There were also the imperfections of the eye, the materials of the object-glass, and the various atmospheric media to be considered, before any crucial exactness could be expected; but that still, under every objection, approaches to satisfactory conclusions must inevitably follow a stricter attention to the subject. I therefore recommended occasional references to the heavens for this object only, with the eye kept in sharp order for the purpose, having carefully experimented the capacity of that organ in strictly identifying the many gradations of colour. Many of the tints of stellar companions would of course turn out to be merely complementary

contrasts; but the inherent colours would become additionally valuable, as strict observation upon them, under efficient means, advanced.

The question is pregnant with interest; and, as I consider it may be advantageously encountered by any sharp-sighted amateur who, possessed of a good telescope and inclined only to easy and pleasing work, is nevertheless desirous of being useful in the cause of knowledge, I have therefore subjoined the list of chromatic comparisons of Sestini's observations with mine; to which I have added those colours which I have since noted at Hartwell. Several of these were confirmed in direct comparison by Dr. Lee; it was an occasion on which the eyes of ladies were prized, and the tints were mostly pronounced without reference to the older records.

Stars.	Cycle No.	SMYTH.		SESTINI.		SMYTH.	
		Epoch.	Colours.	Epoch.	Colours.	Epoch.	Colours.
35 Piscium . .	VII.	1837·9	*A. Pale white* *B. Violet*	1844·8	*A. Yellowish* *B. Azure*	1850·7	*A. White* *B. Purplish*
113 P. O. Ceti . .	XVII.	1832·8	*A. Cream yellow* *B. Smalt blue*	1845·8	*A. Yellowish* *B. Azure*	1849·7	*A. Yellowish* *B. Fine blue*
146 P. O. Ceti . .	XXIII.	1837·9	*A. Pale topaz* *B. Violet*	1845·8	*A. Orange yellow* *B. Dull azure*	1849·7	*A Yellow* *B. Flushed blue*
η Cassiopeæ . .	XXIX.	1843·2	*A. Pale white* *B. Purple*	1845·6	*A. Yellow* *B. Orange*	1850 6	*A. Dull white* *B. Lilac*
65 Piscium . .	XXXI.	1838·2	*A. Pale yellow* *B. Pale yellow*	1844·8	*A. Yellowish* *B. Azure*	1850·8	*A. Pale yellow* *B. Pale yellow*
ψ^1 Piscium . .	XXXVII.	1833·9	*A. Silvery white* *B. Silvery white*	1844·8	*A. Fine azure* *B. Fine azure*	1849·7	*A. Flushed white* *B. Pale white*
α Ursæ Minoris .	XLIV.	1838·2	*A. Topaz yellow* *B. Pale white*	1845·6	*A. Yellowish* *B. Azure*	1849·6	*A. Yellow* *B. Dull white*
ζ Piscium . .	XLVII.	1839·0	*A. Silver white* *B. Pale grey*	1844·8	*A. Yellow* *B. Dingy yellow*	1849·7	*A. White* *B. Greyish*
37 Ceti	XLVIII.	1838·9	*A. White* *B. Light blue*		*A. Yellow* *B. White*	1849·7	*A. Creamy white* *B. Dusky*
ψ Cassiopeæ . .	LII.	1836·3	*A. Orange tint* *B. Blue*		*A. White* *B. White*	1850·2	*A. Golden yellow* *B. Ash-coloured*
85 P. I. Piscium .	LIV.	1837·0	*A. Yellow* *B. Pale blue*	1844·8	*A. Yellow* *B. Azure*		
γ Arietis . . .	LXXII.	1837·9	*A. Bright white* *B. Pale grey*	1844·9	*A. White* *B. White*	1850·7	*A. Full white* *B. Faint blue*

Stars.	Cycle No.	SMYTH.		SESTINI.		SMYTH.	
		Epoch.	Colours.	Epoch.	Colours.	Epoch.	Colours.
λ Arietis . . .	LXXVI	1830·9	*A. Yellowish white* *B. Blue*	1844·9	*A. White* *B. Pale azure*		
α Piscium . .	LXXXI	1838·9	*A. Pale green* *B. Blue*	1844·8	*A White* *B White*	1850·8	*A. Greenish* *B. Pale blue*
γ Andromedæ .	LXXXII.	1843·3	*A. Orange* *B Emerald green*	1846·5	*A. Red orange* *B. Lighter red*	1850·3	*A. Deep yellow* *B. Sea-green*
14 Arietis . . .	LXXXVI.	1833·9	*A. White* *B. Blue*	1844 9	*A. Yellowish* *B. Bluish white*		
72 P. II. Cassiopeæ	XCVII.	1834·8	*A. Pale yellow* *B. Lilac*	1845·6	*A. White* *B. White*		
θ Persei . . .	CIX.	1833·6	*A. Yellow* *B. Violet*	1845·6	*A. Yellow white* *B. Azure*	1849·6	*A. Yellow* *B. Dusky blue*
η Persei . . .	CXV.	1838·8	*A. Orange* *B. Smalt blue*	1845·7	*A. Golden orange* *B. Azure*	1850·7	*A. Reddish yellow* *B. Blue*
32 Eridani . .	CXLVII.	1843·2	*A. Topaz yellow* *B. Sea-green*	1845·9	*A. Yellow* *B. White*	1850·3	*A. Bright yellow* *B. Flushed blue*
φ Tauri . . .	CLVIII.	1832·8	*A. Light red* *B. Cerulean blue*	1845·8	*A. Golden orange* *B. Azure*		
χ Tauri . . .	CLX.	1831·9	*A. White* *B. Pale sky-blue*	1845·8	*A. White* *B. Azure*	1850·7	*A. White* *B Grey*
62 Tauri . . .	CLXI.	1835·9	*A. Silver white* *B. Purple*	1845·8	*A. White* *B. White*	1850·7	*A. White* *B. Pale purple*
88 Tauri . . .	CLXIX.	1832·9	*A. Bluish white* *B. Cerulean blue*	1845 8	*A. White* *B. White*		
τ Tauri . . .	CLXXI.	1831·9	*A. Bluish white* *B Lilac*	1845·8	*A. Very white* *B. Azure*		
ω Aurigæ . .	CLXXIV.	1833·8	*A. Pale red* *B. Light blue*	1845·7	*A. White* *B. White*	1850·7	*A. Flushed white* *B. Light blue*
62 Eridani . .	CLXXV.	1831·9	*A. White* *B. Lilac*	1845·9	*A. Light yellow* *B. Azure*		
14 Aurigæ . .	CLXXXVIII.	1832·8	*A. Pale yellow* *B. Orange*	1845·7	*A. White* *B. Azure*	1850·7	*A. Greenish yellow* *B. Bluish yellow*
23 Orionis . . .	CXCVII.	1835·2	*A. White* *B. Pale grey*	1845·9	*A. Yellowish* *B. Bluish white*	1850·2	*A. Creamy white* *B. Light blue*
111 Tauri . . .	CXCVIII.	1832·9	*A. White* *B. Lilac*	1845·9	*A. Yellowish* *B. White*		
118 Tauri . . .	CCV.	1838·9	*A. White* *B. Pale blue*	1845·9	*A. White* *B. White*	1850·2	*A. White* *B. Bluish*
δ Orionis . . .	CCXI.	1835·1	*A. Brilliant white* *B. Pale violet*	1845·9	*A. Yellowish* *B. Very white*	1850·2	*A. Pale white* *B. Flushed white*
λ Orionis . . .	CCXV.	1843·1	*A. Pale white* *B. Violet*	1845·9	*A. Yellowish* *B. Bluish white*	1850·2	*A. Pale yellow* *B. Purplish*
ι Orionis . . .	CCXVIII.	1832·1	*A. White* *B. Pale blue*	1845·9	*A. Slightly yellow* *B. Azure*		

Stars.	Cycle No.	SMYTH.		SESTINI.		SMYTH.	
		Epoch.	Colours.	Epoch.	Colours.	Epoch.	Colours.
26 Aurigæ . .	CCXX.	1833·1	*A. Pale white* *B. Violet*	1845·7	*A. Yellowish* *B. Blue*	1849·7	*A. Dusky white* *B. Pale blue*
σ Orionis . . .	CCXXII.	1832·2	*A. Bright white* *B. Bluish*	1845·9	*A. Yellow* *B. Azure*	1850·3	*A. White* *B. Grey*
ζ Orionis . . .	CCXXIII.	1839·2	*A. Topaz yellow* *B. Light purple*	1845·9	*A. Yellowish* *B. Azure*	1850·3	*A. Yellow* *B. Flushed blue*
γ Leporis . . .	CCXXV.	1832·1	*A. Light yellow* *B. Pale green*	1845·9	*A. Orange yellow* *B. Orange red*		
8 Monocerotis . .	CCXLV.	1834·2	*A. Golden yellow* *B. Lilac*	1845·9	*A. Pale yellow* *B. Yellowish*	1850·8	*A. Yellow* *B. Flushed blue*
15 Geminorum .	CCXLVII.	1832·0	*A. Flushed white* *B. Bluish*	1845·9	*A. Orange* *B. Yellowish*		
20 Geminorum .	CCLII.	1834·0	*A. Topaz yellow* *B. Cerulean blue*	1845·9	*A. Yellowish orange* *B. Yellow*	1849·7	*A. Yellow* *B. Pale blue*
π^2 Canis Majoris .	CCLXX.	1834·1	*A. Flushed white* *B. Ruddy*	1845·9	*A. Yellowish* *B. Reddish*	1851·3	*A. Bluish white* *B. Ruddy*
α Geminorum .	CCXCII.	1843·1	*A. Bright white* *B. Pale white*	1845·9	*A. Yellowish* *B. Yellow*	1849·2	*A. Very white* *B. Pale white*
ζ Cancri . . .	CCCXV.	1843·1	*A. Yellow* *B. Orange tinge*	1846·0	*A. Yellow* *B. White*	1849·2	*A. Yellow* *B. Bright yellow*
ϕ^2 Cancri . . .	CCCXX.	1843·2	*A. Silvery white* *B. Silvery white*	1846·0	*A. Yellowish* *B. White*	1849·2	*A. White* *B. Pale white*
υ' Cancri . . .	CCCXXI.	1843·2	*A. Pale white* *B. Greyish*	1846·0	*A. White* *B. White*	1849·2	*A. White* *B. Dusky white*
72 P. VIII. Argo Navis	CCCXXIII.	1830·8	*A. Red* *B. Green*	1846·1	*A. Orange red* *B. Yellow*	1851·3	*A. Orange* *B. Bluish green*
108 P. VIII. Hydræ	CCCXXVI.	1839·1	*A. Pale yellow* *B. Rose tint*	1846·0	*A. Orange* *B. Orange*	1849·2	*A. Full yellow* *B. Flushed*
ι Cancri . . .	CCCXXXVI.	1836·2	*A. Pale orange* *B. Clear blue*	1846·0	*A. Fine orange* *B. Azure*	1851·3	*A. Dusky orange* *B. Sapphire blue*
τ' Hydræ . . .	CCCLX.	1831·9	*A. Flushed white* *B. Lilac*	1846·1	*A. Yellow* *B. Yellow*	1851·3	*A. Pale white* *B. Dusky*
6 Leonis . . .	CCCLXIII.	1832 2	*A. Pale rose tint* *B. Purple*	1846·0	*A. Fine orange* *B. White*	1851·3	*A. Flushed yellow* *B. Pale purple*
7 Leonis . . .	CCCLXIV.	1832 2	*A. Flushed white* *B. Violet tint*	1846·0	*A. Rather yellow* *B. White*	1851·3	*A. Bluish white* *B. Pale violet*
9 Sextantis . .	CCCLXXI.	1832·2	*A. Blue* *B. Blue*	1846·0	*A. Dingy orange* *B. Dingy orange*	1851·3	*A. Flushed blue* *B. Pale blue*
35. Sextantis . .	CCCLXXXIV.	1839·1	*A. Topaz yellow* *B. Smalt blue*	1846·1	*A. Pale yellow* *B. Pale yellow*	1849·2	*A. Rich yellow* *B. Cerulean blue*
54 Leonis . . .	CCCXCI.	1839·3	*A. White* *B. Grey*	1846·0	*A. Yellow* *B. White*	1851·3	*A. Silvery white* *B. Ash-coloured*
ϕ Leonis . . .	CCCCV.	1831·2	*A. Pale yellow* *B. Violet*	1846·2	*A. Pale yellow* *B. White*	1851·3	*A. Pale yellow* *B Dusky red*

Stars.	Cycle No.	SMYTH.		SESTINI.		SMYTH.	
		Epoch.	Colours.	Epoch.	Colours.	Epoch.	Colours.
90 Leonis . . .	CCCCXXI.	1835·4	*A. Silvery white* *B. Purplish*	1846·1	*A. White* *B. White*	1851·3	*A. Silver white* *B. Pale purple*
δ Corvi . . .	CCCCXLVI.	1831·3	*A. Pale yellow* *B. Purple*	1846·3	*A. Slightly yellow* *B. White*	1851·3	*A. Light yellow* *B. Purple*
24 Comæ Berenicis	CCCCLI.	1836·4	*A. Orange colour* *B. Emerald tint*	1844·4	*A. Gold* *B. Azure*	1851·3	*A. Orange* *B. Lilac*
143 P. XII. Virginis	CCCCLIII.	1833·3	*A. Pale yellow* *B. Greenish*	1846·3	*A. Red* *B. Azure*	1851·3	*A. Yellowish* *B. Flushed blue*
12 Canum Venaticorum	CCCCLXVI.	1837·4	*A. Flushed white* *B. Pale lilac*	1844·5	*A. Yellow* *B. Blue*	1850·5	*A. Full white* *B. Very pale*
ζ Ursæ Majoris .	CCCCLXXX.	1839·3	*A. Brilliant white* *B. Pale emerald*	1844·5	*A. White* *B. Yellowish*	1849·2	*A. White* *B. Pale green*
ι Bootis . . .	DVIII.	1838·2	*A. Pale yellow* *C. Creamy*	1844·5	*A. Orange yellow* *C. Azure*	1850·6	*A. Light yellow* *B. Dusky white*
π Bootis . . .	DXVII.	1836·5	*A. White* *B. White*	1844·4	*A. Yellow* *B. Less yellow*	1850·6	*A. White* *B. Creamy*
10 Hydræ . . .	DXIX.	1831·5	*A. Pale orange* *B. Violet tint*	1846·4	*A. Yellow* *B. Yellow*	1851·4	*A. Deep yellow* *B. Reddish violet*
212 P. XIV. Libræ	DXXIV.	1833·4	*A. Straw colour* *B. Yellow*	1846·3	*A. Orange* *B. Orange*	1851·4	*A. Yellow* *B. Dusky*
44 Bootis . . .	DXXIX.	1842·5	*A. Pale white* *B. Lucid grey*	1844·5	*A. Orange* *B. Orange*	1850·5	*A. Yellow* *B. Cerulean blue*
δ Bootis . . .	DXXXVII.	1835·5	*A. Pale yellow* *B. Light blue*	1844·5	*A. Gold yellow* *B. Yellowish azure*	1851·3	*A. Yellow* *B. Lilac*
μ' Bootis . . .	DXLII.	1832·3	*A. Flushed white* *B. Greenish white*	1844·5	*A. Yellow* *B. Yellowish azure*	1850·6	*A. Yellowish* *B. Greenish white*
ζ Coronæ Borealis	DXLIX.	1842·6	*A. Bluish white* *B. Smalt blue*	1844·5	*A. White* *B. White*	1850·6	*A. Flushed white* *B. Bluish green*
51 Libræ . . .	DLVIII.	1842·5	*A. Bright white* *B. Pale yellow*	1846·4	*A. Orange* *B. Orange*	1850·6	*A. Creamy white* *B. Pale yellow*
β Scorpii . . .	DLIX.	1835·4	*A. Pale white* *B. Lilac tinge*	1846·4	*A. Yellow* *B. Whitish*	1851·4	*A. Yellowish white* *B. Pale lilac*
κ' Herculis . .	DLX.	1835·4	*A. Light yellow* *B. Pale garnet*	1844·5	*A. Yellow* *B. Orange*	1351·3	*A. Pale yellow* *B. Reddish yellow*
ν Scorpii . . .	DLXI.	1831·5	*A. Bright white* *B. Pale lilac*	1846·5	*A. Yellowish* *B. White*	1850·6	*A. Pale yellow* *B. Dusky*
σ Scorpii . . .	DLXVIII.	1838·3	*A. Creamy white* *B. Lilac tint*	1846·5	*A. Yellow* *B. White*	1851·4	*A. Dusky white* *B. Plum colour*
236 P. XVI. Scorpii	DXCIII.	1833·4	*A. Yellowish white* *B. Pale green*	1846·5	*A. Yellow* *B. White*	1851·4	*A. Creamy white* *B. Greenish*
μ Draconis . .	DCII.	1839·5	*A. White* *B. White*	1844·5	*A. Yellow* *B. Azure*	1850·7	*A. White* *B. Pale white*
36 Ophiuchi . .	DCIV.	1842·4	*A. Ruddy* *B. Pale yellow*	1846·5	*A. Orange yellow* *B. Orange yellow*	1851·4	*A. Ruddy tint* *B. Yellowish*

Stars.	Cycle No.	SMYTH.		SESTINI.		SMYTH.	
		Epoch.	Colours.	Epoch.	Colours.	Epoch.	Colours.
39 Ophiuchi . .	DCVII.	1838·5	A. *Pale orange* B. *Blue*	1846·5	A. *Orange* B. *Yellow*	1851·4	A. *Pale orange* B. *Bluish*
ν Serpentis . .	DCX.	1832·6	A. *Pale sea-green* B. *Lilac*	1846·5	A. *Yellow* B. *Red*	1851·4	A. *Silvery tint* B. *Native copper*
ρ Herculis . .	DCXIII.	1839·7	A. *Bluish white* B. *Pale emerald*	1844·4	A. *Yellow* B. *Deeper yellow*	1850·5	A. *Greyish* B. *Greenish*
53 Ophiuchi . .	DCXVIII.	1836·5	A. *Bluish* B. *Bluish*	1844·5	A. *White* B. *Azure*	1850·5	A. *Greyish* B. *Pale blue*
95 Herculis . .	DCXXXI.	1833·8	A. *Greenish* B. *Cherry red*	1844·5	A. *Gold yellow* B. *Gold yellow*	1851·3	A. *Pale green* B. *Reddish*
70 Ophiuchi . .	DCXXXIII.	1842·5	A. *Pale topaz* B. *Violet*	1845·9	A. *Gold yellow* B. *Gold yellow*	1849·5	A. *Topaz yellow* B. *Purplish*
ο Draconis . .	DCLXXII.	1837·9	A. *Orange yellow* B. *Lilac*	1844·5	A. *Fine orange* B. *Copper colour*	1851·3	A. *Orange* B. *Lilac*
15 Aquilæ . . .	DCLXXVIII.	1831·6	A. *White* B *Lilac tint*	1846·5	A. *Reddish* B. *Red orange*	1851 4	A. *Yellowish white* B. *Red lilac*
28 Aquilæ . . .	DCXC.	1331·4	A. *Pale white* B. *Deep blue*	1844·5	A. *White* B. *Yellow*	1851·4	A. *Dusky white* B. *Lilac blue*
β Cygni . . .	DCC.	1837·6	A. *Topaz yellow* B. *Sapphire blue*	1844·5	A. *Orange gold* B. *Azure*	1849·6	A. *Golden yellow* B. *Smalt blue*
ε Sagittæ . . .	DCCIV.	1833·8	A. *Pale white* B. *Light blue*	1844·5	A. *Yellow* B. *Bluish yellow*	1850·6	A. *Faint yellow* B. *Bluish*
54 Sagittarii . .	DCCV.	1837·6	A. *Yellow* B. *Violet*	1846·5	A. *Orange* B. *White*	1350·7	A. *Yellow* B. *Pale lilac*
ζ Sagittæ . . .	DCCXVIII.	1838·6	A. *Silvery white* B. *Blue*	1844·5	A. *Yellowish white* B. *Azure*	1850·6	A. *Flushed white* B. *Cerulean blue*
56 Aquilæ . . .	DCCXXII.	1834·6	A. *Deep yellow* B. *Pale blue*	1846·5	A. *Yellow* B. *Yellow*	1850·6	A. *Yellow* B. *Bluish*
κ Cephei . . .	DCCXLIII.	1838·8	A. *Bright white* B. *Smalt blue*	1844·6	A. *Yellowish* B. *Azure*	1851·3	A. *Pale yellow* B. *Blue*
γ Delphini . .	DCCLXII.	1839·7	A. *Yellow* B. *Light emerald*	1844·5	A. *Orange* B. *Yellow*	1850·7	A. *Golden yellow* B. *Flushed grey*
ε Equlei . . .	DCCLXX.	1838·8	A. *White* B. *Lilac*	1844·5	A. *Gold orange* B. *Azure*	1851·4	A. *Pale yellow* B. *Bluish lilac*
1 Pegasi . . .	DCCLXXXII.	1833·9	A. *Pale orange* B. *Purplish*	1844·5	A. *Orange* B. *Azure*	1851·4	A. *Deep yellow* B *Lilac blue*
β Cephei . . .	DCCLXXXIX.	1843·1	A. *White* B. *Blue*	1844·6	A. *White* B. *White*	1851·3	A. *Yellowish* B. *Flushed blue*
3 Pegasi . . .	DCCXC.	1837·8	A. *White* B. *Pale blue*	1844·5	A. *White* B. *Yellow*	1850·5	A. *Flushed white* B. *Greyish*
ε Pegasi . . .	DCCXCIV.	1833·6	A. *Yellow* B. *Blue*	1844·5	A. *Gold yellow* B. *Azure*	1851·4	A. *Bright yellow* B. *Blue lilac*
μ Cygni . . .	DCCXCV.	1839·6	A. *White* B. *Blue*	1844·5	A. *Yellow* B. *More yellow*	1850·6	A. *White* B. *Pale blue*

Stars.	Cycle No.	SMYTH.		SESTINI.		SMYTH.	
		Epoch.	Colours.	Epoch.	Colours.	Epoch.	Colours.
29 Aquarii . . .	DCCC.	1830·8	*A. Brilliant white* *B. White*	1846·5	*A. Red orange* *B. Same, lighter*		
ξ Cephei . . .	DCCCII.	1839·6	*A. Bluish* *B. Bluish*	1844·6	*A. White* *B. Yellowish*	1851·4	*A. Flushed* *B. Pale lilac*
ζ Aquarii . . .	DCCCXIII.	1842·6	*A. Very white* *B. White*	1845·8	*A. Orange yellow* *B. Pale yellow*	1849·2	*A. Flushed white* *B. Creamy*
δ Cephei . . .	DCCCXV.	1837·7	*A. Orange tint* *B. Fine blue*	1844·6	*A. Orange* *B. Azure*	1849·2	*A. Deep yellow* *B. Cerulean blue*
τ Aquarii . . .	DCCCXXII.	1838·7	*A. White* *B. Pale garnet*	1845·8	*A. White* *B. Azure*	1849·2	*A. Pale white* *B. Flushed*
ψ' Aquarii . . .	DCCCXXXIII.	1834·9	*A. Orange tint* *B. Sky blue*	1845 8	*A. Gold* *B. Azure*	1850·8	*A. Topaz yellow* *B. Cerulean blue*
94 Aquarii . . .	DCCCXXXIV.	1838·9	*A. Pale rose tint* *B Light emerald*	1845·8	*A. Orange yellow* *B. Orange*	1850·8	*A. Orange tint* *B. Flushed blue*
101 P. XXIII. Cassiopeæ	DCCCXXXIX.	1830 8	*A. Light yellow* *B. White*	1844·6	*A. White* *B. Yellowish*		
107 Aquarii . . .	DCCCXLIV.	1832 8	*A. Bright white* *B. Blue*	1845·8	*A. Yellowish white* *B. Yellowish*	1850·7	*A. White* *B. Purplish*

All the differences in the above list are subject to several doubts, and many of the records have been noted without a very strict attention to the question. I have, in the Cycle, mentioned the many disagreements between the tints of stars as given by Sir William Herschel and myself; and the anomaly is partly accounted for by his peculiarity of vision, and the tone of metal in his reflectors. But I am at a loss why refractors should differ so widely as here shown; and therefore hope the subject will be more closely pursued than it has hitherto been. I am aware that the notations independently made at various epochs will vary in term, though to the observer's eye they may mean nearly the same tint; but some of the differences mentioned by Signior Sestini in his interesting Memoir are singularly striking. He says—"Now, beginning with the companion of γ Andromedæ, we have Smyth emerald-green and Sestini white; but Herschel and Struve at another date call it azure. Moreover, observing it again after a lapse of two years, and four years after Smyth, I

find it no longer white, but a strong blue!" And again—"Now see B (95) Herculis; according to Smyth one is greenish and the other red; but we think them both a golden yellow. A Ophiuchi, by Smyth, one ruddy and the other pale yellow; but we take them to be both orange. The contrary occurs in ι Bootis, the components of which by Smyth are both pale yellow; but we deem one to be orange and the other azure."

Under the circumstances to which I have already alluded, I am not at this stage disposed to theorize on the objects thus brought into juxta-position: and the colours of double-stars must be much more accurately assigned, and more ably experimented upon, before we can admit that the nature and character of those suns can possibly change in short periods. Sir David Brewster observes, that there can be no doubt that in the spectrum of every coloured star certain rays are wanting which exist in the solar spectrum; but we have no reason to believe that these defective rays are absorbed by any atmosphere through which they pass. And in recording the only observation perhaps yet made to analyse the light of the coloured stars, he says—"In the orange-coloured star of the double-star ζ Herculis, I have observed that there are several defective bands. By applying a fine rock-salt prism, with the largest possible refracting angle, to this orange star, as seen in Sir James South's great achromatic refractor, its spectrum had the annexed appearance (in the Campden Hill Journal), clearly shewing that there was one defective band in the red space, and two or more in the blue space. Hence the colour of the star was orange, because there was a greater defect of blue than of red rays."

In the present incertitude, it is suggested that variations in colour may be owing to variations in stellar velocity; but in this case would there not also be as palpable a variation in brightness? If it shall be found that the tints actually vary, the comparative magnitude should also be carefully noted, to establish whether a variability in brightness accompanies the changes of colour. Sestini, however, does not view the matter in this light: he holds that the undulations of each colour arrive in succession to our eyes, and that therefore at last, when they have all reached us, they will appear white. In

arguing the circumstances necessary for the case—as the strength of vibrations, with their number and velocity in a given time—he cites Huyghens, Euler, Young, Fresnel, and Arago. Quoting Herschel's data he observes, that five hundred and thirty-six billions of vibrations cause us to see yellow, whilst six hundred and twenty-five billions exceed the number that shews blue: that is, when the tangential celerity of the moving star in relation to its companion comes at its maximum to equal one-thirteenth of that of light. Its green colour will change insensibly into yellow on increasing its distance, and then, receding through the same steps, it will again become green; beyond which, as it approaches the eye, it will become a full blue; finally, in the inverse order, it will return to green, and so on. But if we accelerate the velocity of the star to one-fifth of that of light, we shall have the number of vibrations corresponding to red = four hundred and eighty-one billions, and seven hundred and twenty-one billions, which exceeds that of violet. In this supposition, the green star when furthest from its companion will become red, and when approaching it must be of an intensely strong violet tinge; after which, owing to its circular orbit, it will in receding again become green, thus passing through all the colours of the spectrum. These are the ratios—

$$536 : 625 :: 1-\tfrac{1}{13} : 1+\tfrac{1}{13} :: 12 : 14 :: 6 : 7.$$
$$481 : 721 :: 1-\tfrac{1}{5} : 1+\tfrac{1}{5} :: 4 : 6 :: 2 : 3.$$

Admitting these and the like grounds, as the laws of new stars and binary systems may be somewhat elucidated thereby, I strongly recommend repeated examinations of the brightness and colours of stars to the well-equipped amateur, who is also happily possessed of a good eye, perseverance, and accurate notation. But even thus prepared, I would advise him, before entering upon the undertaking, to study well the third chapter of the great work of my highly-esteemed friend Sir John Herschel, on the Uranography of the Southern Hemisphere: it treats of Astrometry, or the numerical expression of the apparent magnitudes of the stars. In a more advanced state of this question, the measurement of brightness should always accompany that of colours, since

a change in the one might possibly produce variation in the other: and who can say that numerical measures may not yet be made with such precision that the distance of stars thereby may be given? The observer must not however be unnerved by the difficulties, some of them apparently insuperable, which beset the inquiry: nor by the philosopher's assertion that "nothing short of a separate and independent estimation of the total amount of the red, the yellow, and the blue rays in the spectrum of each star would suffice for the resolution of the problem of astrometry in the strictness of its numerical acceptation; and this the actual state of optical science leaves us destitute of the means even of attempting with the slightest prospect of success." This is indeed a damper to our argument, so far at least as stars differing in colour are concerned; but perseverance in a good cause has often been rewarded with marvellous accomplishments,—and it is well to remember that

> By many blows that work is done,
> Which cannot be achieved with one.

These remarks will hardly be impinged upon in practice by taking one objection to the facts upon which Sestini's theory is founded, namely, the velocity of the stars; since, in the present day—even admitting proper motions and translations in space to their fullest extent—it is not necessary to consider the possible rate of sidereal movements as capable of bearing any sensible ratio to the speed of light. In citing the case of the orbital velocity of the companion of a double star, he should have applied it to α Centauri, an object of which we know all the elements, its distance from us and from each other in miles, the mass of the components as compared to our Sun, their quantity of light as compared to the same, and the periodic time;—all these we know to a greater degree of confidence than in any other similar body. Now the theory fails upon this test; for the mean orbital velocity of the companion may be assumed as 2·5 miles per second, while Sestini's limits of $\frac{1}{13}$ and $\frac{1}{5}$ of the velocity of light would make it fifteen thousand and thirty-eight thonsand miles in the same time. The velocity of light assumed here is, however, it

must always be remembered, that of the Sun; — that determined by direct observations of the solar orb itself, or by the eclipses of Jupiter's satellites, whose reflections still give us solar light, and traversing the same medium, whatever it be, filling the planetary spaces. But we may reasonably expect, and, indeed, the experiments detailed above, on the spectra of different stars, appear to indicate, if not actually to prove, that the light of some of the stars is absolutely of a distinct nature, and radically of a different composition, to that of the Sun; while the media which the rays have to pass through, may be of a kind unknown in any part of the whole extent of our planetary circles, and of a nature of which we are at present profoundly ignorant.

Evidently, therefore, when the speed of transmission of the stellar rays comes into play, we may have to deal with velocities very different to that on which our correction for aberration is founded. Granting that however, and to the widest extent, extending even the somewhat doubtful experiments which have been made on the velocity of electric light as compared with the solar, and on the transmission of ordinary light through air and through the denser medium of water, still there is nothing as yet to shew, that we are likely to meet with any kind of light moving at so slow a rate, as to bear the proportion which Sestini's theory requires to the actual speed at which any star has been found to move.

There is, however, another way in which the peculiar habitudes of rays of light may produce a difference of colour in a star, and make it even run through the whole of the colours of the spectrum from one end to the other and back again, in a greater or less space of time according to the particular circumstances of the case. This will occur if the different coloured rays of which the white beam is composed, have intrinsically in themselves, or by reason of the nature of the medium which they traverse, any difference in the velocity of their transmission.

According to the Newtonian doctrine of "emission," the separate colours are actually produced by different degrees of velocity. But, according to the "undulating" theory, which has since been shown by Young and

Fresnel to be far more probable than the other, if not really to be the true theory, the various tints are produced by means of undulations of different lengths, and they have even been able to measure the lengths of these minute waves, and have assigned them as follows:—

	Inch.
Red	0·00002582
Orange yellow	0·00002319
Green	0·00002073
Blue	0·00001912
Indigo	0·00001692
Violet	0·00001572

Now, though this by itself may say nothing with respect to the rapidity with which each undulation may be transmitted, it renders the probability of such a difference extremely great; and, though that difference be so very small that there is no hope of ever being able to make it manifest in any scientific apparatus of even the most delicate description, yet, on account of the great distance of the stars, the effect may become at length very sensible. For although the difference of the rate of propagation of the waves of each ray may be the smallest conceivable quantity, yet, if that different rate be kept up during the whole one thousand years that we suspect must be occupied by the light of some of the stars in reaching us, notwithstanding that it may travel on the average one hundred and ninety-two thousand miles in a second, it is manifest that, after continuing to grow during so great a length of time, a very decided effect may at last be produced.

If a new star suddenly appears in some part of the sky, the rays of light immediately travel off to announce the fact everywhere, and to us amongst the number of other orbs; and it matters not whether the light consist in the emission of particles, or the propagation of waves of different orders, as many of Arago's "couriers" as there are different colours in the spectrum are sent off with the intelligence; and, if one is able to accomplish the great intervening distance between the star and us in a less space of time than the others, and so arrive before them, we shall see the star of that colour first, say blue. In that case the next to arrive would be the yellow, and then arriving and

mixing with the blue, already come, would make the star change from blue to green; while the red, arriving last of all, and joining themselves to the existing green, would at length make the star appear white; and, if it preserved the same lustre, it would ever after continue white.

If the star, however, is shown for only an instant of time, as an electric spark, then we should see it varying through each of the different colours, blue, yellow, and red, separately and distinctly. If, for example, the blue ray was to traverse the space between the star and ourselves in three years, the yellow in three years and one week, and the red in three years and two weeks, and supposing the above to apply only to the central portion of each coloured ray, which should gradually vary with filaments of different velocities so as to join insensibly with those of the neighbouring one, then, three years after the striking of this stellar spark, we should see a blue star appear in the sky, and last for one week, then the star would appear yellow during another week, and red during another; after which it would be lost altogether. If there are actual separations between the different colours, as is more than hinted at by the discovery of the black bands in the spectrum, then the star, after appearing of one colour, might disappear for a time before the next colour began to arrive.

Again, if a star which has existed for ages be on a sudden extinguished, the rays last emitted will be the couriers to announce the fact; and, supposing the star to have been white, three years afterwards (in the above particular example), the last of the blue rays having arrived before the last of the others, the blue will be deficient in the star, and from white it will become orange; after a week all the yellow ones will have come in, and the star will be red; and, when the final rays of this colour have arrived, it will totally disappear.

But if the star shines permanently, and has so shone from time immemorial, then, whatever might be the difference of time elapsing between the blue and red rays shot out from the star at the same instant reaching us, we should see the star white; for blue and yellow and red rays of different dates of emission would all be reaching our eyes together.

This case can be exemplified by looking through a prism at a white surface of unlimited extent and equal brightness, when it will be seen as white as before; for the multitudinous spectra formed by all the component points of the whole surface overlaying each other, the red of one coming to the blue and yellow of others, will form white light, as completely as if the three colours of one point be concentrated together again. Here was Goethe's error: he gazed at a white wall through a prism, and, finding it white still, kicked at Newton's theory to produce an absurd one of his own. But had he looked at the edges of the wall—which is a similar case to the birth or death of a star—he would have seen the blue half of the spectrum on one side, and the red on another: everything, in fact, with a sensible breadth, will have coloured borders, blue on one side and red on the other. If one part of the wall, however, be brighter than another, the strong blue of that, thrown on to the fainter red of another, will give that a bluish tinge, and *vice versa:* and so with the stars, if their brightness should alter, or in the common but singularly erroneous parlance, their magnitudes vary, the strong blue of a bright epoch arriving with the faint red of a dull period, will make blue appear to us as the predominating colour; will cause indeed the star's light to appear decidedly blue at one time, and, *mutatis mutandis*, red at another, although all the while the star's colour may not really have altered at all; but may have been really, and would have appeared to observers close by, as white as ever, varying only in quantity and not in quality. Real alterations in colour may doubtless occur, but evidently may often be only consequences of alterations in brightness which may be brought about by many regular and periodical phenomena, and certainly do not require the introduction of any such startling reason as the conflagration which was lugged in to explain the tints through which the variable star of 1572 passed, as it gradually died out of the sky, where it had so suddenly appeared a few months previously. Of this, at least, we may be certain, that there are periodical variations in the brightness of the stars, and that some alteration of colour should thereby be produced; but whether to a sensible extent or not, is only to be determined by experiment. β Persei

has been selected by Arago as a favourable instance for testing this matter by observation, because it changes so very rapidly in brightness in a short space of time; but, though he did not succeed in detecting any alteration of colour, we must not despair; for, while on the one hand his means of determining the colour seem to have had no sensible degree of exactness, it is easily possible to assume such a difference of velocities for the various coloured rays of the star, and such a distance for them to traverse, as should completely annihilate the expected good effect of the quickness and frequent recurrence of the changes in this particular star; many other stars might indeed be picked out where the natural circumstances are more promising, while the perfection of the means of observation would allow of many more still being made subservient to the inquiry.

The failures made here therefore may be regarded in the same light as those in the olden inquiry of finding the parallax of the fixed stars, viz. not as reasons for leaving off, but for trying again more energetically, more extensively, and with more accurate means than before; and, although I may not be prepared just at present to describe any perfectly satisfactory method of observation, still, as some amateurs desirous of pursuing the subject may like to see such hints as my experience has necessarily given rise to, presented in some rather more practical form, I have thrown them together as follows:

In any method of determining colours of stars, three possible sources of error have to be met: 1. The state of the atmosphere generally at the time in altering the colour of all the stars above the horizon; 2. The effect of altitude in varying on different stars the apparent colour produced by the atmosphere; and 3. The effect on the eye of the necessary quantity of some sort or other of artificial light, for the purpose of writing down or examining the dimensions of the instrument, the face of the clock, &c. &c.

The first can only be eliminated by extensive observation of a number of stars, especially circumpolar ones, all through the year. Although the colours of some stars may vary in a small number of months, weeks, or even days, the mean of them all may be considered to be safely depended on for a tolerably

constant quantity; and each star should be examined and tested for its colour every night, by comparison with the mean of all the rest; and where any decided variation appears to be going on through the year, that star should at once be excluded from the standard list, and its difference from the mean of the others stated as its colour for each night's observation.

The second source of error is to be met by observations of the same star through a large part of its path from rising to culminating, or of a number of stars of known colour at various altitudes, combined with a correction something similar to that of refraction, as varying in a proportion not far from the tangent of the zenith distance, and which would consequently require the altitude of every body observed to be noted, as a necessary element in reducing the observations.

Low stars, however, should be eschewed, and each observer should confine himself as far as possible to his zenith stars; for, in addition to the low ones being so much fainter to him, than to one to whom they are vertical, and in addition to the colouring and absorbing effect of the atmosphere increasing so excessively, low down on the horizon, the envelope acts so strongly there as a prism that, combined with the bad definition prevailing, I have sometimes seen a large star of a white colour really appear like a blue and red handkerchief fluttering in the wind: the blue and red about as intense and decided as they could well be. This shews the extreme importance of noting not only the altitude of the star, which determines also the degree of prismatic effect, but of distinguishing in the observation any difference between the upper and lower parts of the star. In the Sun and Moon, bodies of very sensible breadth, this effect is not so evident; the surface will still be white or coloured uniformly by the atmosphere, and the upper and lower borders will alone show the prismatic colours, half on one edge and the other half on the other, as in the case of the white wall mentioned above; but the star, being merely a point of light, is wholly acted on, and exhibits as complete a spectrum as could be contrived without any of the white or self-compensating intermediate portion.

Combined with this, is the colouring effect of the object glass, and any deficiency of its achromaticity; but these, being nearly the same on all the stars, will not affect the difference observed: yet the latter quality of the eye-piece will be of more consequence, unless the star be brought very rigorously into the centre of the field of view, and kept there the whole time that it is under observation. An achromatized eye-piece should be specially used.

The third difficulty may be best counteracted by using one eye for the field of the telescope, and the other for writing down, &c.; having the artificial light used for these purposes as faint, and making them as white, as possible, with various other little practical details which will best occur to each observer.

We then come to the grand difficulty: viz. the manner in which the colour is to be determined; the methods are two: first, by the senses; second, by instrumental means. The first is that which has been employed hitherto, and will doubtless still be the only method employed for a considerable time by amateurs; and, though so very vague, yet may—by the education and the practice of the senses, combined with the corrections above considered—be carried to considerable perfection: but the education must be much more systematic and the practice much more constant than they have hitherto been.

Some certain standard of colours must be kept and constantly referred to: the colours of precious stones have been used for this purpose; but, though very proper in one point of view, as being by their brightness more comparable to stars than ordinary pigments are, yet astronomers in general have not much acquaintance with anything so valuable and costly; and, if they had, would find that the colour of each star is not certainly to be defined by its name, *i. e.* that under the same name many different colours may be found; and different observers will therefore be giving the same name to stars not resembling each other; in addition to which, there is not a sufficient range of colours amongst the precious stones to meet all the cases which occur in nature in the heavens, and they neither admit of being mixed, to form varieties of colour, nor of being modified, to show gradations in their own colour; a most

important defect. These qualities, however, are possessed by the water colours of the present day; the greater part of them are very permanent, and the others, which are not so, are capable of being prepared fresh and fresh; the number of colours moreover is great, the combinations that may be formed of them almost endless; and gradations of each may be made, from nearly white to next to black. Not only must a scale of them be had in possession, and frequently referred to, but it must be made and remade by the observer, as a mode of impressing the colours on his memory; and, unless he can carry them in his mind, he need not attempt the chromatic observation of stars; for, as he cannot see the star and his scale of colour at the same instant, and side by side, the estimate of the star depends entirely on the memory.

Many persons may think that a mere glance at colours is enough to impress them at once on the memory, and that, without any practice at that sort of remembrance, they can keep any tint in their mind for any length of time; but a more erroneous idea was never entertained. To these unhappy persons greens are greens, and blues, blues; and they have never entered even the region of colours, and a whole world of intellectual enjoyment is for ever closed against them. Bring them to the proof of their boasted powers; shew them any portion of a landscape; and then place colours before them, and make them put down the various tints from memory, and this a week or two after the scene was witnessed. If hardy enough to attempt the task, every one of their tints will be found in error, and they will only put down one, where nature had fifty. Even the painters confess that, though colour may be a low branch of their art, yet it is the most difficult: only look at the walls of the Royal Academy, and see how rarely is a good colourist to be met with; and, when he is, how the initiated will gloat over the matchless and magic variety and mellowness of tints, while the uninitiated can see barely more than one; and that, to them, not noticeably different from the world of common-places beside it. Only look, too, at the characteristics of those painters who *draw* from nature, but do not *colour* also from her;—who make their sketches in the open air with pencil or sepia, and fancy colouring to be so

simple and so easily remembered, that they may do that afterwards comfortably and at home. Their works are known wherever they are seen, by the poverty of tints, and by the uniformly monotonous colours that are always employed in the same manner: the human mind cannot invent to any extent, but only put together in a novel manner materials collected from the external world. And such materials in colouring, can only be impressed on the memory by actual painstaking and laborious copying and working from nature, by making the tints and applying them in imitation of her. By such training, this branch of memory may be strengthened as well as any other; for we find that the works of artists who adopt this method are always superior in their colouring to those of others, even when they paint from the memory or the imagination. And one of the best colourists that we have ever had in landscape painting was so impressed with the importance of cultivating the memory in this manner, that he used, even in the days of his prosperity and the high prices of his works, to spend much time in the open air making studies in oil; and then, as soon as they were made, tore them up; so that, as the followers of Cortez saw the necessity of conquering, when their commander burnt the ships in which they might have made an inglorious retreat, and exerted themselves accordingly,—in the same way, not being able to refer, when painting a picture at home, to the sketch made in the open air, he felt himself necessarily obliged to tax his powers of memory, and make them exert themselves to the very utmost.

The second, or instrumental method of determining colour, need not be entered upon at much length here, as amateurs are not very likely to practise it; and would be working generally at a great disadvantage compared with any instrument in a public observatory specially devoted to this object. Brightness is everything with this method, and this must be commanded, both by elevating the telescope into a high region of the atmosphere, and by adopting the largest possible size of aperture; for, not only must photometrical determinations of the brightness of different sections of the spectra of stars formed by prisms, be made; but the black lines in the spectra of each star must also be

carefully examined into, as all the transcendant accuracy of modern optics depends on them. This instrumental method of reducing colour to brightness and place, in addition to the exactness of the numerical determination of which it is then capable, would further overcome a most important source of error, and one which has not been touched upon in all that has gone before, and would affect to its fullest extent the method of the "senses," namely, chromatic personal equation.

In the first volume of my Cycle of Celestial Objects, pages 302 and 303, I instanced the peculiarity of certain eyes in their being unable to distinguish colours correctly, and yet capable of proper action in every other use of them. Every one knows those violent cases of it where a person cannot distinguish green and red and other such egregious contrasts, and would not admit such a person's observations of colour at all; but it is by no means so generally known as it should be that a personal equation of greater or less amount exists in every case, and the reason of the faulty colouring of so many artists is, that they really are not aware of many of the refinements of colour: their eyes not perceiving them, their fingers cannot render them. In one of the most intense examples, however, of this chromatic personal equation, although the person could not distinguish so bright a scarlet as the flower of the pomegranate from the genuine green of its leaf, I have had abundant proof that his eye was able to perceive brightness, independent of colour, as acutely, if not much more so, than the generality of men.

These, then, being the advantages of the instrumental method, we may hope that they will not be lost sight of. If it be true that the Government is about to send a large reflector to Australia to observe the southern nebulæ, it might also forward another to a tropical region for observing the planets and to make chromatic observations of the stars. The Australian telescope will have more work than sufficient with the nebulæ, and the planets with their faint satellites will be low down in the north there, while we have them low in the south here; but the equatorial telescope will have them in its zenith; and it may be elevated on some table-land there far higher into the atmosphere

than the Australian one can be; a very important matter where colours, rather than brightness, are concerned; for a want of the latter may be corrected merely by using a larger aperture; but a distortion of the former, once introduced, is utterly irremediable.

§ 7. THE STORY OF γ VIRGINIS.

In the brief mention which I made of double stars, at pages 284-6, it ought, perhaps, to have been noted, that by the measurement of the angle which the meridian makes with a line passing through both components of the object under observation, together with measures of the distance of the stars from each other, the form and nature of the orbit are determined: and of those compound systems which have, to an almost conclusive conviction, been proved to obey the power of gravitation, none has attracted greater attention from the astrometers of the day than γ Virginis.

A detailed history of this very remarkable binary-star, one of the first recognised as a revolving system, was published in my Cycle of Celestial Objects in 1844. But, as the present volume will be before readers who have not seen that work, and in order to bring up the whole matter together to the present time, I shall commence this section with an entire reprint of my former account:—

CCCCLVI. γ VIRGINIS.

AR $12^h\ 33^m\ 33^s$ PREC. + $3^s{\cdot}07$
DEC. S $0^\circ\ 34'{\cdot}3$ —— S $19''{\cdot}84$

POSITION	77°·9	(w 6)	DISTANCE	1″·6	(w 2)	EPOCH	1831·38
———	71°·4	(w 5)	———	1″·2	(w 3)	———	1832·40
———	63°·6	(w 7)	———	*not taken*		———	1833·23
———	62°·7	(w 8)	———	1″·3	(w 2)	———	1833·44
———	48°·8	(w 6)	———	1″·0	(w 2)	———	1834·20
———	45°·5	(w 5)	———	0″·8	(w 2)	———	1834·39
———	15°·0	(w 5)	———	0″·5	(w 1)	———	1835·40

POSITION	*round* (w 9)	DISTANCE	*round* (w 9)	EPOCH 1836·06
———	*round* (w 9)	———	*round* (w 9)	——— 1836·15
———	*blotty* (w 8)	———	*blotty* (w 5)	——— 1836·25
———	350°·9 (w 4)	———	*elongated* * (w 5)	——— 1836·30
———	348°·6 (w 4)	———	*elongated* (w 5)	——— 1836·39
———	265°·4 (w 3)	———	0″·6 (w 1)	——— 1837·21
———	235°·7 (w 3)	———	0″·8 (w 2)	——— 1838·28
———	217°·2 (w 5)	———	1″·0 (w 2)	——— 1839·40
———	192°·8 (w 5)	———	1″·9 (w 3)	——— 1843·08
———	191°·6 (w 8)	———	1″·9 (w 5)	——— 1843·33

A fine binary star, in Virgo's right side, heretofore known as *Porrima* and *Postvarta* by Calendar *savans.* A 4, silvery white; B 4, pale yellow, but though marked by Piazzi of equal magnitude with A, it has certainly less brilliancy; and the colours are not always of the same intensity, but whether owing to atmospherical or other causes remains undecided. They are followed by a minute star nearly on the parallel, and about 90″ off. With β, δ, and η, it formed the XIIIth Lunar Mansion, and was designated, from its position in the figure, *Záwiyah-al-'auwà,* the corner of the barkers. This most instructive star bears north-west of Spica, and is 15° distant, in the direction between Regulus and γ Leonis, which are already aligned. A very sensible proper motion in space has been detected in A, and there can be no doubt of B's standing on in the same course; the most rigorous comparisons of recent observations afford the following values:—

Piazzi	AR. — 0″·72	Dec. + 0″·10
Baily	— 0″·50	— 0″·02
Argelander . . .	— 0″·52	— 0″·02

It was with much gratification that I watched this very interesting physical object through a considerable portion of its superb ellipse, and I was fortunate enough to attack it during the most critical period of its march. It is rather singular that, brilliant as these two stars are, various occultations of γ Virginis by the Moon have been recorded, without allusion to its being double. So lately as the 20th March, 1780, the phenomenon was watched by nine astronomers; yet at Paris

* This was the most puzzling of all my double-star trials; for, so unexpected was the phenomenon, that I gazed long and intently before pronouncing it *round* in the month of January: and it was only on repeated scrutiny that I had an impression that the object was in rather an elongated form in April, which impression was confirmed by the 21st of May. The weights were, however, added to the angle rather to substantiate my own conviction by the senses, than to attest accuracy of measure. About this time I received a letter from Dr. Robinson, of Armagh, informing me that he had no difficulty in elongating γ with Sir James South's large refractor.

only, on that occasion, is mention made of one star being occulted 10^s before the other. On the 21st January, 1794, the occultation was observed by four astronomers; yet no one mentions duplicity. This is passing strange, because Cassini had, in 1720, perceived and recorded the two stars, noting that the western disappeared 30″ before the other, behind the Moon's dark limb, but they emerged nearly together. He could not divide them with a telescope of eleven feet, but with one of sixteen they were well severed, and of equal magnitudes. He watched the immersion, which was oblique, with great care, hoping by refraction or discoloration to detect a lunar atmosphere; but though the circumstances were favourable, he perceived no symptom. Yet the observation was held to be of importance, for, by enlisting that able astronomer and Bradley, Sir John Herschel considered that he gained some useful points in the orbital departure; and the results of more than a century, previous to my measures, may be thus shortly stated:—

Bradley and Pound	Pos. 160° 52′	Dist. *caret*	Ep. 1718·20
Cassini II.	*caret*	7″·49	1720·31
Mayer	144° 22′	6″·50	1756·00
Herschel I.	130° 44′	5″·70	1780·06
Herschel II. and South . .	103° 24′	3″·79	1822·25
Struve	98° 18′	2″·28	1825·42
Dawes	78° 15′	2″·01	1831·33

A mere inspection of the conditions below stated, shows the vast acceleration of the revolving star on approaching its periastre, and the retardation of its getting away again. These are the annual rates of retrograde angular progress:—

Mayer . . .	0°·43	1756·00	Myself . . .	17°·37	1834·39
Herschel I. . .	0°·57	1780·06	—— . . .	30°·20	1835·40
H. II. and South	0°·64	1822·25	—— . . .	*round*	1836·06
Struve . . .	1°·59	1825·42	—— . . .	26°·78	1836·39
Dawes . . .	3°·39	1831·33	—— . . .	25°·55	1837·21
Myself . . .	5°·43	1832·40	—— . . .	22°·01	1839·40
——	9°·40	1833·23	—— . . .	16°·52	1843·08
——	15°·25	1834·20	—— . . .	6°·63	1843·33

As the rigorous observations and computations of this object must be deemed a sort of *experimentum crucis* of the sidereal connected systems, I may be excused for entering into rather fuller details of the detection and establishment of so wonderful an elliptic motion, than I have yet indulged in among the binaries; and it will thereby serve as an example of the method of procedure with those interesting objects.

The various observations were most ably and zealously discussed by Sir John, and treated in a

straight-forward, geometrical mode, so as to be widely available; as will be seen on consulting the Fifth Volume of the Memoirs of the Royal Astronomical Society. The method is equally novel and ingenious. Assuming that the motions of binary stars are governed by the universal law of gravitation, and that they describe conic sections about their common centre of gravity and about each other, he was bent on relieving their discussion from the analytical difficulties attending a rigorous solution of equations, where the data are uncertain, irregular, and embarrassing. Measures of position were to be the sheet-anchor; for distances, with the exception of the major semi-axis, were peremptorily excluded from any share of consideration in the investigation, because of their notorious looseness and insecurity.

"The process," said he, "by which I propose to accomplish this, is one essentially graphical; by which term I understand, not a mere substitution of geometrical construction and measurement for numerical calculation, but one which has for its object to perform that which no system of calculation can possibly do, by bringing in the aid of the eye and hand to guide the judgment, in a case where judgment only, and not calculation, can be of any avail."

Under the assumption, therefore, that gravitation governs, and one of the components revolves, while the other, though not necessarily in the focus, is at rest, the curve is constructed by means of the angles of position and the corresponding times of observation; and tangents to this curve, at stated intervals, yield the apparent distances at each angle, they being, by the known laws of elliptical motion, equal to the square roots of the apparent angular velocities.

Thus armed, Sir John proceeded with the orbit of γ Virginis. From the above positions and epochs, with interpolated intermediates, a set of polar co-ordinates was derived, and thence, for the apparent ellipse, the following elliptical elements:—

Major semi-axis	5″·862
Position of major semi-axis	67° 20′
Eccentricity	0·70332
Maximum of distance	9″·423
Position at the maximum distance	218° 55′
Minimum of distance	0″·514
Position at the minimum distance	1° 15′
Date of next arrival at minimum distance . .	1834·39
Greatest apparent angular velocity . . .	– 68°·833
Least apparent angular velocity	– 0°·193

The next process was to obtain the elements of the *real* ellipse, and the whole consequent investigation is so succinctly described in the paper alluded to, that any zealous tyro may tread in the same steps, with a little attention. The results, together with a comparison of the elements and observations up to the period of the computation, and an ephemeris of the system for the years 1832, 1833, 1834, and 1835, were inserted in the Supplement to the Nautical Almanac for 1832. But, finding a discrepancy between the measures then obtained and the places predicted, Herschel, nothing daunted, again took the field, and recalculated the orbit, as described in the Sixth Volume

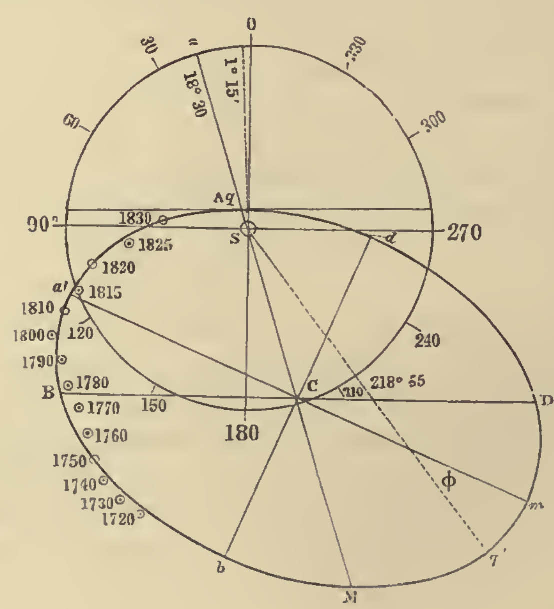
of the Astronomical Memoirs. In this process, my measures of 1832 and 1833 were included, and the two conclusions stood thus:—

	1831.	1833.
Major semi-axis	11″·830	12″·090
Perihelion projected	17° 51′	36° 40′
Eccentricity	0·88717	0·8335
Inclination to plane of the heaven	67° 59′	67° 02′
Position of node	87° 50′	97° 23′
Mean annual motion	−0°·70137	−0°·57242
Period in tropical years	513·28	628·90
Perihelion passage	1834·01	1834·63

In giving the first part of these remarkable elements to the astronomical world, Sir John said:—

"If they be correct, the latter end of the year 1833, or the beginning of the year 1834, will witness one of the most striking phenomena which sidereal astronomy has yet afforded, viz. the perihelion passage of one star round another, with the immense angular velocity of between 60° and 70° per annum, that is to say, of a degree in five days. As the two stars will then, however, be within little more than half a second of each other, and as they are both large, and nearly equal, none but the very finest telescopes will have any chance of showing this magnificent phenomenon. The prospect, however, of witnessing a visible and measurable change in the state of an object so remote, in a time so short (for, in the mean of a very great number of careful measures with equal stars, a degree can hardly escape observation), may reasonably be expected to call into action the most powerful instrumental means which can be brought to bear on it."

And this was Sir John's projected ellipse—



From the extreme delicacy of so novel a case, all the conditions were not yet met, so that this bold prediction was not circumstantially verified, although it was admirably correct in substance. Whilst rushing towards the nearest point of contact, or shortest distance of the revolving star from its primary, and the proximity became extreme, the field was left, as far as I know, to Sir John Herschel at the Cape of Good Hope, Professor Struve at Dorpat, and myself at Bedford. Our measures afforded unquestionable proofs of the wonderful movement under discussion; yet they certainly exhibited greater discrepancies than might have been expected from the excellence of the instruments employed. But the increased angular velocity which so eccentric a star acquired when gaining its periastre, and the closeness of its junction, rendered the operations extremely difficult: added to which, the brightness of two such stars was sufficient to call forth that disadvantage, arising from the inflection of light, which the wire micrometer labours under, and which interferes in the exact contact between the line and the luminous body.

The accelerating velocity of angular change was thus vigilantly watched, until the commencement of the year 1836, when an unexpected phenomemon took place. Instead of the appulse which a careful projection drawn from the above elements had led me to expect, I was astonished, on gazing at its morning apparition in January, to find it a single star! In fact, whether the real discs were over each other or not, my whole powers, patiently worked from 240 to 1200, could only make the object round. I instantly announced this singular event to my astronomical friends, but the notice was received with less energy than such a case demanded; none of the powerful refractors in this country were pointed to it in time; and it is to be regretted that we had not the benefit of the unexcelled Dorpat telescope's evidence at the critical epoch in question. This state of apparent singleness may have existed during the latter part of 1835; for, when I caught it, as may be seen in the observations above, it was very near a change. At length, about the beginning of June, 1836, a letter arrived from Sir John Herschel, addressed to Mr. Baily, wherein he detailed his observations on the single state of this star at the villa of Feldhausen, Cape of Good Hope, in his twenty-foot reflector. Under the date of February 27th, that unwearied astronomer says:—

"γ Virginis, at this time, is to all appearance a single star. I have tormented it under favourable circumstances, with the highest powers I can apply to my telescopes, consistently with seeing a well-defined disc, till my patience has been exhausted; and that lately, on several occasions, whenever the definition of the stars generally, in that quarter of the heavens, would allow of observing with any chance of success, but I have not been able to procure any decisive symptom of its consisting of two individuals."

The companion now took such a movement as quite to confute a large predictive diagram I had constructed, showing that the orbit was extremely elongated, more like a comet's than a planet's; which gave me a suspicion that we had been looking at the ellipse the wrong way. Hereupon I returned to the Herschelian process to obtain the elements of the apparent and the true ellipse with my new measures, but could neither accommodate the period nor arrive at any satisfactory conclusions. When, therefore, M. Mädler's masterly computations appeared in the *Astronomische Nachrichten,* my views were greatly countenanced; but, with a full value for the talent and zeal of that astronomer's process, I was still anxious for Sir John Herschel to return to his own field, and meet the apparently unaccountable informalities which still remained. Having made a request to this effect, he replied:—

"*Maugre* I cannot yet send you any finalities about γ Virginis, yet to prove that I have not been quite idle, I will state one or two general conclusions that a projection of all the observations has led me to, preparatory to exact numerical computation. 1. We are *all wrong*, Mädler and all of us, and it is the early observation of Bradley in 1718 which has misled us. That observation is totally incompatible with *any* reasonable ellipse, and must be absolutely rejected. Had it not been for my respect for that single observation, I should have got very near the true ellipse in my first approximation. 2. The period is short of one hundred and fifty years. My conjecture, antecedent to *any* exact calculation from my projection, is one hundred and forty-three, which is considerably less than the least of Mädler's, and beyond his assigned limits of error. 3. I suspect Mädler's perihelion to be half a year too early, and that the true perihelion passage took place at 1836·6 or thereabouts. We shall get on better now that we have found out the black sheep."

Thus duly authorised, I attacked the orbit again, rejecting, with some regret, Bradley, Pound, Cassini, and Mayer, and assuming ♅'s observations of 1780 as the point of departure. Taking, therefore, the epochs from that date to 1843 for abscissæ, and the observed angles for ordinates, a fresh set of periods was obtained, through which the interpolating curve was led on a very large scale.* From the interpolated positions corresponding to the *assumed dates* between 1780 and 1843, the intervals being first decennial, then quinquennial, and afterwards more rapid still, the angular velocities were concluded, and by their aid the distances as radii vectores. These positions and distances were laid down from the central star as an origin of polar co-ordinates. Now, though this is a simple and merely graphic process of obtaining the elements of both the apparent and true ellipse, and is liable to shakiness, it undeniably shows the physical fact of a highly-elongated orbit; and several of the conditions prove that, notwithstanding the present anomalous differences, we are arriving near the mark. It is singular how all the determinations of the eccentricity have agreed, thus:—

	First orbit.	Second orbit.		First orbit.	Second orbit.
Encke . . .	0·890	0·860	Mädler . . .	0·864	0·868
Herschel II. .	0·887	0·834	Myself . . .	0·883	0·872 †

As the ellipse projected by Sir John Herschel, under *all* the epochs, has been given, the reader may like to see the figure produced by the Bedford observations, which yields a period of about one hundred and eighty years.

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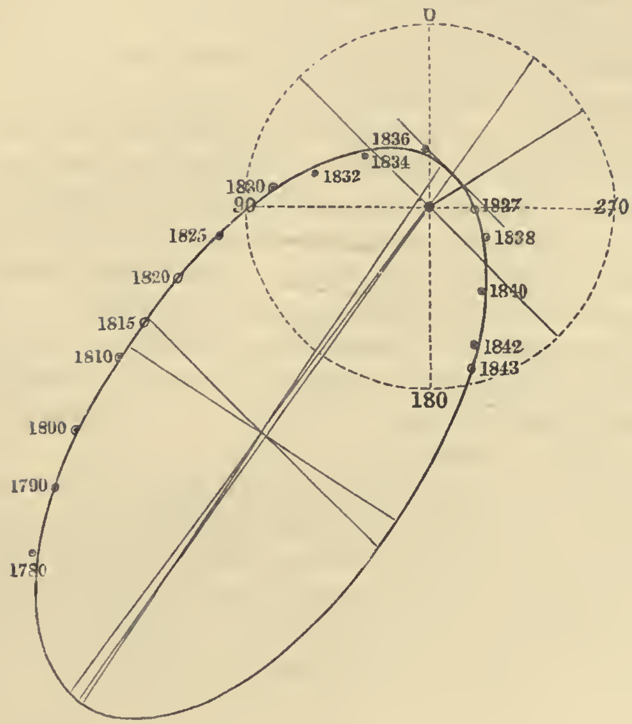
* Sir John Herschel informs me, that he has disused the method of drawing tangents for the angular velocities. The substitute is a closer reading off of the curve, equalising the differences on paper, and thence deducing the angular velocities by first and second differences (if needed); but first will generally suffice.

† In order to bring this very important condition under one view, I will here subjoin some of the determinations since arrived at, namely—

Henderson . . .	0″·8590	Smyth *(Bedford only)* .	0″·8682
Hind . . .	0″·8566	Herschel *(Cape Observation)* .	0″·8795
—— *(Bedford only)* . .	0″·8804	——— *(last)* . .	0″·8860
Smyth . . .	0″·8725	Adams	0″·8796



As the resulting elements, though better, were still unsatisfactory, I was about to take another point of departure and try again, when I received a letter from Sir John Herschel, dated Collingwood, 9th July, 1843, of which the following is an extract:—

"I wrote to you last that I could not make Bradley's observations agree with *any* ellipse consistent with the later observations, and that Mädler's elements, which assume the correctness of that observation, are inadmissible. I have now satisfied myself that this is really the case, and that Mädler's period admits of being yet reduced. But still it is necessary to suppose materially greater errors *in one direction* over the whole interval 1828, 1829, 1830, 1831, than I quite like. The mean of Dawes's and my own measures, however, is on the whole exceedingly well represented in all the critical and puzzling part of the orbit corresponding to 1830—1834 inclusive. Your observations of 1831, 1832, and 1833, offer discordancies of $+2°$, $+2\frac{1}{2}°$, and $+3°$, which are, considering the then considerable closeness of the stars, not more than might well be committed. But Struve's are quite inexplicable; his errors, supposing the orbit correct, run thus:—

1825	1828	1829	1831	1832	1833	1834
$+1°$	$+3°$	$+3\frac{1}{2}°$	$+4\frac{1}{2}°$	$+5°, +7°$	$+6°$	$+7\frac{1}{2}°$

after which the deviation ceases.

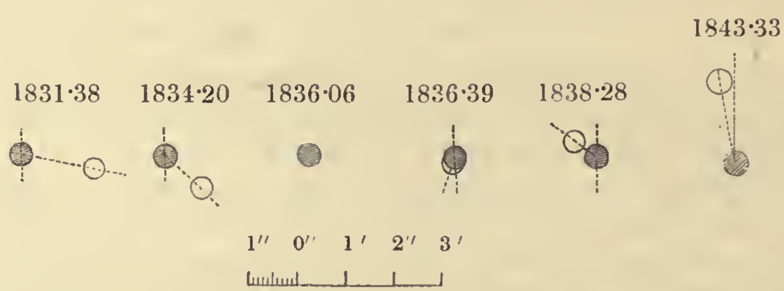
"On the whole I consider the proofs of gravitation afforded by this star quite satisfactory. It is

true that I am forced to admit an error of $-3\frac{1}{2}°$ in my father's measure of 1781, and an error exceeding 2° in the same direction in his subsequent mean result for 1803; but when I recollect what sort of micrometer and apparatus he used, I am not disposed to quarrel with these.

"I am not satisfied with my inclination and node, and there is still a tendency in the curve of the star, if your measures of this year be correct, to run away from its proper course, *to bolt;* which leads me to believe that these elements are not yet so well determined as I hope to get them. Your ellipse from the Bedford observations is a very beautiful one, but I have not yet compared your elements with the observations. I am somewhat surprised at the length of your period, as I find one hundred and twenty-six years represents the mean of all the observations (including Struve's) on the whole well. I have been chiefly attending to improving the *method* as a working one, and I am preparing a paper on the subject, in which the orbit of γ will occur in exemplification. What I aim at is, a *direct process* leading to the separate correction of each element, in place of a turmoil of calculus on the principle of least squares, which in cases of such discordant observations is, if not illusory, at least unnecessarily troublesome."

The inquirers into binary systems will yearn for the coming of this discussion; meantime, to use an expression of Pliny the Younger, I am fortunate in my heliacal rising, since what I have here stated may be of a little interest, before it shall be obscured and eclipsed in Herschel's brighter eminence.

One word more. To those who are earnest upon either of these topics, I submit a diagram of what I saw myself, which may render the above details more evident:—



Such a phenomenon has had more discussers than beholders, so that astute doubts have been flung out of these stars being amenable to gravitation, whether their angular changes are reducible by the laws of elliptical motion, whether the period be a little longer or shorter, and all that. Nay, with such unquestionable instances before the world, and at the very time that admiration was incited in every reflecting mind, a blundering Zoilus, who, had he *flourished* at an earlier age, might have figured at Galileo's trial, was permitted to stain the Church of England Quarterly Review, April, 1837, p. 460, with the following Bœotian attempt at sprightliness:—

"We have forgotten the name of that Sidrophel who lately discovered that the fixed stars were not single stars, but appear in the heavens like soles at Billingsgate, in pairs; while a second astronomer, under the influence of that competition in trade which the political economists tell us is so advantageous to the public, professes to show us, through his superior telescope, that the apparently

single stars are really three. Before such wondrous Mandarins of Science, how continually must *homunculi* like ourselves keep in the back-ground, lest we come between the wind and their nobility."

This plural unit must truly be, so far as education and intellect are concerned, the downright veritable *homunculus* he has written himself.

The would-be wit, however, though quite as ignorant, is perhaps less malignant than a fellow reviewer, who must needs meddle with works beyond his ken. This stultified Bavius asserts, that it best suits with the knowledge we possess of our finite understanding, and with the purport and end of our being, to refrain from *silly* speculations which may perplex, but can never satisfy the mind. He holds it both vain and wicked to attempt to probe the infinity of space, and decries Sir William Herschel's estimate of the magnitude of the nebula in Orion, as a speculation to confuse rather than instruct the mind. This man is susceptible of very great improvement before his opinions command respect. So far from science being daring and proud, as he asserts, there are abundant reasons for it to feel humbled; but the effusion in question shows the proper nursery of those qualities,

For he that has but impudence,
To all things makes a fair pretence.

In strict accuracy, I should here state that the magnitudes and colours above given of the components of γ Virginis, are not quite satisfactory, inasmuch as I have often been under the impression that the southern star is the brightest of the two; while the tint of the northern one has sometimes bordered upon pale violet, the opposite of yellow. It may assist the memory of the inexperienced observer, to remind him that the primary colours and their complementaries may be thus placed—

Red . . .	*Green.*
Blue . . .	*Orange.*
Yellow . . .	*Violet.*

and from these a scale may be readily drawn up of the subsidiary tints and their opposites (the male and female lights of Milton), through all the twistings of Iris. To return, however, to the Story, I must now detail the occurrences which have taken place since the above was printed.

While the Cycle was in the press, my much-regretted friend the late Professor Henderson, of the Royal Observatory at Edinburgh, called upon me, and looked over several parts of the manuscript; on which I drew his attention to some of the binary systems, and promised to send him a proof-sheet

of the above the moment it should be printed. After forwarding it, I received a letter dated November 18th, 1843, which is so material to the "Story" from his skilful handling of the subject, that I cannot but here reprint it:—

You will no doubt think me very inattentive for not sooner replying to your letter of 17th October; but when it arrived, I was immersed in work of different kinds: not only that of the Observatory, sufficient when well performed to take up my whole time, but other avocations which had been accumulating from my absence and other causes. But I never lost sight of your communication (for which I am much obliged, as it has forced me to study a subject which I had previously read only in a cursory manner), and expected from day to day to commence its investigation. But it has only been during the last week that, by devoting every spare hour to it, I have satisfied myself regarding it.

The determination of the orbits of double stars from observations presents practical difficulties, in consequence of the great comparative errors to which the observations are liable. The problem is a similar one to that of the orbits of comets deduced from the most rough estimates of their positions, perhaps erroneous to the extent of 20° or 30°. Cases such as these have frequently occurred in the determination of orbits of ancient comets; and it has consequently happened that different investigators have obtained orbits that bear no resemblance to each other.

The oldest observation of the double star γ Virginis that we have, is that of Pound and Bradley in 1718. Sir John Herschel has from it obtained the angle of position 160° 52′. (Memoirs Astronomical Society, vol. v. p. 36.) By trigonometrical calculation I find that in 1718 the great circle joining α and δ Virginis was inclined at an angle of 153° 33′ to the horary circle passing through the middle point between them. If we correct this by the quantity mentioned by him, we obtain 150° 50′ for the angle of position of γ Virginis, observed at that epoch.

The next observation is that of the lunar occultation in 1720, observed by Cassini. The moon was then within less than twenty-four hours of the full, and although the actual immersions at the dark limb were no doubt observed, I do not believe it possible that Cassini saw the actual emersions from the bright limb. Indeed, his words do not bear this meaning, but rather that at a certain moment he saw both stars emerged and parallel to the moon's limb. This of itself implies that the stars were at a small distance from the limb. Besides, the occultation was one of short duration; consequently, the stars apparently passed near the top or bottom of the moon's disc. In such situation stars that were seen parallel to the moon's limb could not emerge at the same moment. It may be proper to have this occultation recomputed, in order to ascertain whether the calculated relative positions of the two stars satisfy the conditions of their immerging at the two moments indicated by Cassini, and of their being parallel to the moon's limb and at a small distance from it, at the other time mentioned. But it is probable that the unavoidable errors of the Lunar Tables may have too great influence on the result.

When a good stock of observations has been obtained, I believe that in order to obtain the most probable orbit, we should proceed in a manner similar to that adopted for comets and planets. In the first place, from the requisite number of observations to be selected from the stock, obtain an approximate orbit, to be afterwards corrected so as to represent, as nearly as possible, and within

the limits of the probable errors, all the observations. In the first part of the process, Herschel's, Encke's, or Savary's method may be obtained, and distances must be employed, either actually observed, or deduced from the angular velocities; for an attempted solution of the problem at this stage, depending on angles of position alone, would speedily end in a complication of transcendental equations quite unmanageable. If the distances are obtained from the angular velocities, then, according to a remark of Encke, the angles of position from which the velocities are deduced should be taken at intervals of time neither too great nor too small. I should say that we cannot depend on the angular velocity of γ Virginis obtained from Sir William Herschel's observation of 1781; for, not only is it separated from the next of 1802 by too great an interval, but it has no proper one preceding it to give co-operation. I would rather rely on the observed distance of 1781.

When an approximate orbit has been obtained, the differences between the angles of position computed from and observed give the materials for obtaining a set of six normal angles, from which a better orbit may be determined. This is the second part of the process, and it may rest on angles of position alone, if the distances are considered to be unsafe in the circumstances. The method of proceeding which I prefer is that of Mädler, in No. 363 of *Astronomische Nachrichten.* Six equations are formed expressing the relations between the differences of the observed and computed normal places, and the corrections of the elements necessary to be applied in order to make these differences disappear. The solution of these equations gives the required corrections of the elements; but, should they turn out considerable, in which case the values of their co-efficients in the equations may not have been got with sufficient accuracy, it will be advisable to repeat the process, starting now from the elements corrected. The requisite calculations, if more than one repetition is not necessary, are not laborious, for the calculations are easily made, and great precision need not be effected. In place of Mädler's expressions for the co-efficients of $\triangle e$ (the correction of the excentricity), $\triangle \mu$ (the correction of the mean annual motion), and $\triangle T$ (the correction of the time of perihelion passage), I have employed those given by Gauss in the *Theoria Motus Corporum Coelestium.* Indeed, the calculations are so simple, that in the case of more observations than six, but not too numerous, the method of *minimum* squares may be applied to them all; for if the proper weight can be assigned to each observation depending on its probable error, the orbit to represent best all the observations will be obtained.

I have applied this second part of the process to six selected observations of angles of position of γ Virginis. I assumed for the approximate orbit Mädler's corrected one in the No. of *Astronomische Nachrichten* referred to. Several repetitions would have been spared, if I had started from his more correct one given in No. 452 of *Astronomische Nachrichten.* However, I at last obtained the following orbit:

Time of perihelion passage	1836·29
Mean annual motion	2° 30′·59
Ex-centricity	0·8590
Perihelion on orbit	319° 23′
Inclination	23° 5′
Node	70° 48′
Time of revolution	143·44 years.

The following is a comparison between the observed angles of position and those computed in this orbit:

Date.	Angle observed.	Angle computed.	Difference.	Observer.
	° ′	° ′	° ′	
1718·22	150 50	161 16	— 10 26	Pound and Bradley.
1756·29	144 22	141 1	+ 3 21	Mayer.
1781·89	130 44	130 44	0 0	Herschel I.
1803·20	120 19	120 21	— 0 2	"
1822·25	103 24	103 17	+ 0 7	Herschel II. and South.
1825·32	97 24	97 58	— 0 34	Struve and South.
1828·36	91 0	90 26	+ 0 34	Herschel II. and Struve.
1829·30	88 0	87 18	+ 0 42	" "
1830·38	82 5	82 53	— 0 48	Herschel II.
1831·38	74 54	77 41	— 2 47	Smyth.
1832·40	71 24	70 42	+ 0 42	"
1833·34	63 9	61 21	+ 1 48	"
1834·30	47 9	46 27	+ 0 42	"
1835·40	15 0	11 56	+ 3 4	"
1837·21	265 24	266 8	— 0 44	"
1838·28	235 42	235 26	+ 0 16	"
1839·40	217 12	218 23	— 1 11	"
1843·20	192 12	192 38	— 0 26	"

The first two differences are perhaps not greater than might be expected from the modes of observation. The greater difference of 1831 is evidently owing to an error of observation; * while that of 1835 may be accounted for by the extreme difficulty in the measurement, owing to the closeness of the stars. I have not computed the observation of 1836, as it must be liable to a very considerable error.

These elements appear to be now so correct, that I believe they may be safely employed as the groundwork of future investigations. They differ very slightly from Mädler's last elements given in No. 452 of *Astronomische Nachrichten*, as the following comparison shows:

* Unfortunately it was an error of the press, for Henderson worked from the proof-sheet which had been forwarded. My attention was called to it by a correspondent's asking Sir John Philippart, the Editor of that useful publication the United Service Journal, which angle of position he was to trust to—that published in his "Number for December, 1837, or that printed in the Cycle of Celestial Objects in 1844, the one being 77° 54′ and the other 74°·9′?" It was most vexing, not so much that a compositor should mistake a 7 for a 4, but that we should not have detected it in correcting the press! Happily all's right in Sir John Herschel's splendid orbit for 1845. The observations of 1836, as I have already remarked, formed a case of extreme difficulty,—for the eyes of one or two friends who were consulted could only pronounce the object to be single.

	Mädler.	Henderson.
Time of revolution . . .	145·409 years	143·44 years.
Mean annual motion . . .	— 148′·453	150′·59
Time of perihelion passage . .	1836·313	1836·29
Node	60° 37′·6	70° 48′
Inclination	24° 39′·2	23° 5′
Perihelion	318° 59′·7	319° 23′
Ex-centricity	0·86815	0·8590

The difference of 10° in the position of the node produces scarcely any sensible effect in the computed angles of position. Hence the place of the node will always be subject to uncertainty.

I have not computed the value of the semi-axis major. This is to be done by comparing the observed and computed distances.

The agreement between the observed and computed places is such; that in my opinion it shows satisfactorily that the motions of these stars are subject to the Newtonian law of gravitation.

The result of this investigation has given me great confidence in Mädler's results for other stars. In this instance he has gone the right way to work, and has obtained a good result.

P.S. I omitted to say that the six angles of position from which I computed the orbit are those of 1781, 1803, 1822, 1835, 1837, and 1843. I also omitted to say that Mayer observed a lunar occultation of the two stars on April 3, 1757. (Mayer's Observations, Part II. p. 18.) Immersions at the dark limb—interval between the two immersions 16 seconds. This observation may yet be calculated. Mädler's last elements, as given in No. 452 of *Astronomische Nachrichten*, are adapted for angles of position numbered 180°, differently from yours, Herschel's, &c.

From these statements, which except to astrometers I fear are somewhat lengthy, it is manifest that, though the several deduced orbits of this system represent, with more or less accuracy, the observations made use of, they differ very materially in other respects, especially in the period of revolution; and that, notwithstanding all the labour expended on the inquiry, considerable doubt remained as to the computed elements. Even under my own operations, the period varied from one hundred and thirty-five to one hundred and ninety-six years! Still a truly important point was carried, and a signal advantage added to physical science, in that the elliptic motion of the binary was completely established. I shall therefore proceed with the further scrutiny of the pro-

gressive movements; but, as this "Story" pertains to Bedford and Hartwell, those operations only will be noticed which, so to speak, were personally connected, although the high value of the lucid investigations of such philosophers as Encke and Mädler are held in admiration, and the measures of the continental astronomers respected.

In strictly examining the contending deductions for the several ellipses, I could not but be forcibly struck with the uncertainty of even the apparently best micrometrical measures; and the inter-comparisons above noted, indicate pretty plainly that full confidence cannot yet be placed upon any of them. The importance of the whole question to Sidereal Physics was so obvious, as to induce me to continue my observations as a contribution to the mass of measures which the case still demands; and, as it became palpable that accurate and satisfactory elements are only obtainable by the unremitting exertions of various practical astrometers, I addressed a letter to the Royal Astronomical Society in May, 1845, shewing the necessity of following up γ, because that remarkable system promises to be comparatively to double-stars what Halley's comet is among that class of bodies. The mean results of the measures I then handed in, gave—

Position, $185^\circ\ 23'{\cdot}3^{(w\,6)}$; Distance, $2''{\cdot}10^{(w\,4)}$; Epoch, 1845·34.

Soon after this was published, namely in July of the same year, I had the gratification of receiving a letter from my indefatigable friend J. R. Hind, inclosing the following orbital elements of γ Virginis:—

Perihelion passage 1836·228.

Perihelion on the orbit	$319^\circ\ 46'{\cdot}1$
Node	$78^\circ\ 28'{\cdot}4$
Inclination	$25^\circ\ 14'{\cdot}1$

Eccentricity 0·85661 $\therefore\ \phi = 58^\circ\ 56'{\cdot}3$

Mean annual motion — $152'{\cdot}871$

Period $141^{\text{yrs}}297$.

For the calculation of the angles of position in this orbit, we have :—

$$u - [3{\cdot}46905].\ \sin.\ u = [2{\cdot}18433]\ (1836{\cdot}228 - t)$$
$$\tan.\ \tfrac{1}{2}\ v = [0{\cdot}55609].\ \tan.\ \tfrac{1}{2}\ u$$
$$\tan.\ (\theta - 78^\circ\ 28'{\cdot}4) = [9{\cdot}95644]\ \tan.\ (v - 118^\circ\ 42'{\cdot}3)$$

u being expressed in minutes.

The epochs employed and the errors of my elements are as follows : —

		θ observed.	Comp.—observed.
HERSCHEL I.	1781·89	130° 44′·0	— 4′·8
————	1803·20	120° 19′·0	— 1′·7
HERSCHEL II. and SOUTH .	1822·25	103° 24′·0	+ 3′·5
DAWES	1831·33	78° 15′·0	+ 8′·8
Captain SMYTH	1838·28	235° 42′·0	+ 9′·8
————	1845·34	185° 23′·3	— 5′·6

The sums of the squares of the errors in my orbit = 243·0
In Mr. HENDERSON'S orbit = 589·0.

The conditions thus kindly furnished, indicated that the various computations were now approaching something bordering on unanimity in the periodic time of perihelion *(periaster ?)*, the last point to arrange; while that very important element, the ex-centricity, was evidently near the mark. So far so good; still, in order to aid the ultimate settlement of such a desideratum to the utmost, I was at my post during the two following apparitions: and these were the results :—

Position, 182° 58′ (w 7); Distance, 2″·6 (w 4); Epoch, 1846·39.
——— 181° 52′ (w 6); ——— 2″·6 (w 5); —— 1847·41.

Although what had been achieved in several quarters would now admit of an interval from work taking place, I again angled to get hold of a plausible period; for that element had hitherto proved so precarious, as seemingly to carry an inherent uncertainty into the problem. Throughout the proceedings, the conformity of the elliptic motion to the great law of gravity is assumed; and, in order to arrive at speedy conclusions, Herschel's graphic method of drawing tangents to an interpolating curve struck me as being at least equal

to our present power of observing. To be sure Sir John had, as I have said, abandoned the use of tangents; and he recommended me an easy and simple numerical process, which does away with the errors incident to the laying down of angles, and the problem becomes merely one of conic sections. His letter—dated Collingwood, 20th April, 1847—is so truly interesting in an astro-metrical light, that I cannot but take the liberty of here inserting it:—

First and foremost let me mention that in the sheet I sent you about γ Virginis, p. 299, there is a vile erratum—the semiaxis is stated $9''\cdot69$ (owing to an unreduced value of a having slipped into the copy instead of the reduced one). The real value is $3''\cdot58$, which agrees well with your's; $9''\cdot69$ must have startled you, as it did me when I came to refer to it.

Next let me observe that your new orbit, I mean the first you give in your note, does not so very far deviate from mine—for you make your $\lambda + \Omega = 269\ 17 + 48\ 56 = 318\ 13$
and I make it . . . . $313\ 45 + 5\ 33 = 319\ 18$
and both (the inclinations being small) are not far in their value from π, which in your orbit is $319°\ 46'$, and in mine comes out by formula $\tan(\pi - \Omega) = \cos.\ \gamma \tan \lambda$

$$\pi = 321°\ 48'$$

and I hold it for certain that this value cannot well be more than a degree or two wrong. Any how $\lambda + \Omega$ has a remarkable fixity.—See how the orbits run in this respect—

Henderson's $\Omega + \lambda =$	319° 23′
Hind's	319° 46′
My last	319° 18′
Mädler Ast. N. No. 452	319° 0′
Mädler (letter of Sep. 29, 1845)	320° 20′
Your first orbit in this note	318° 13′
Your second do.	319° 10′ *

Really this is very remarkable. Quite as much so as the exceeding correspondence of all the excentricities.

The real difficulty is and always will be about Ω and γ.

When the inclination γ is under 30° or thereabouts, this difficulty will always arise. In fact if γ be very small, both γ and Ω become indeterminate.

The provoking thing is the excessive latitude of P. And on this point I question if we shall come to any correct conclusion, till a revolution has been nearly accomplished.

Mr. Dawes sends me as the results of his measures with the Munich telescope:—

$$1847\cdot27,\ \theta = 182°\ 2'.\quad \text{Dist.} = 2''\cdot63.$$

---

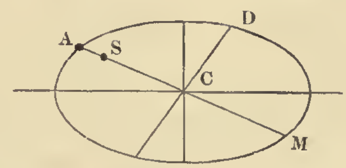
* My position of perihelion in the orbit which follows = 319° 46′, and is the element quoted by Sir John in the second paragraph of this letter.

Capt. Jacob's measures, in a former note of yours, give :—

$$1846{\cdot}32\text{—}\theta=182^\circ\ 12'.\quad \text{Dist.}=2''{\cdot}89.$$
$$\text{mean } 1846{\cdot}795\text{—}\theta=182^\circ\ 7'.\qquad 2''{\cdot}76.$$

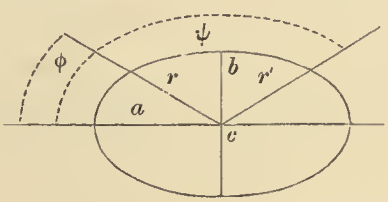
which projected on my chart falls almost to a nicety upon my interpolating curve. Still however Dawes's recent measures, agreeing with Mädler's, give positions less advanced than my curve would indicate, from which it would seem that even 182·12 years (my P.) is too short. But that I can hardly believe.

I now absolutely reject drawing any tangents at all. As you very rightly remark, when the tangent is drawn at the extremity of the major axis projected as situated in the present case, a trifling error of graphical manipulation spoils all. The numerical process is easy and simple. The problem is this :—Given the semi-axis major and minor of an ellipse, and the length of any one of its semi-diameters.



Required, first, the length of the semi-diameter conjugate to it; secondly, the angles which these two semi-diameters make with the axis and with each other.

This is an easy problem of conic sections, and it does away with all errors of the graphical laying down of angles, substituting measurements of length which are much more accurate.



Given . . . a, b, r,
Required . . . r^1, ϕ, ψ,
and $\therefore$ . . . ψ—φ.

1st. $r^2+r'^2=a^2+b^2 \therefore r^1=\sqrt{a^2+b^2-r^2}$

2d. $\cos.\ \phi=\frac{a}{r}\sqrt{\frac{r^2-b^2}{a^2-b^2}}$

3d. $\tan.\ \psi=\frac{a^2-b^2}{a^2}\ \text{cotan.}\ \phi.$

which by-the-bye are not ugly formulæ and of exceedingly easy calculation. This relation $\tan.\ \phi \times \tan.\ \psi =$ constant, I don't remember to have seen in treatises on conic sections. It is very useful.

But, as my main view was to find what great nicety would effect in the geometrical inspection of the case, as still being, under all its imperfections, an inviting method for amateurs, I again sought the radii vectores through the angular velocities, although commanding the advantage of having direct measurements of distance at hand; and a steady course was pursued, in face of the hazard as to whether the points of observation fell at all remote or irregular.

To many except the class I am addressing, the following details of my orbit for 1847 may prove too wordy, but it can readily be "skipped."

Notwithstanding the rebukes upon Bradley's noted observation of 1718, I thought that the curve might be brought in so as to afford points for an apparently reasonable ellipse, by adopting my last drawing *(ut supra)*, instead of that used by Sir John in his first paper. As, however, the paucity of observations about that date allows such latitude in the manner of drawing the curve, I did not, when passing an ellipse through the deduced points, endeavour so much to meet them, as those in the more authenticated part. Different circumstances, it is true, will modify Bradley's point to different uses, but as it hardly satisfies the requirements of the orbit, I shall not introduce it into future argument: it is a remarkable observation certainly, but at best is merely an angle of position obtained by an arbitrary allineation of the two components of γ with α and δ Virginis.

Proceeding as before stated, and laying down from the assumed central star the positions interpolated, with the distances calculated from the curve, I found that the figure which met them all best, bore the following elements for the apparent ellipse:—

Major semi-axis	3·0697
Minor do.	1·7643
Position of major semi-axis	140°
Ex-centricity	0·8143
Greatest apparent distance	5″·748
Position at do.	139° 40′
Least apparent distance	0·393
Position at do.	319° 50′

To arrive through these at the elements of the real ellipse, I brought the tangential method to a severe trial; and it became sufficiently evident that the slightest error of projection might mar the problem, where, as in the instance before us, the projected and apparent major-axis were only 14′ apart. Indeed it seemed difficult to make sure of not drawing the tangent incorrectly

by a degree or two; and the difference of a few minutes only in the inclination of this tangent, completely alters all the other elements when using the formulæ recommended. Few desirable cases are without obstacles: under all the difficulties of the present one, the attempt at conquest was made, but as some of the values would not adapt themselves to the instance—for they brought out the real minor semi-axis less than the apparent one, which is impossible—I was at the trouble of obtaining the real semi-axes of their inclinations by the more operose method of computing the major semi-axis from the minor one and the ex-centricity, both of which were given by measurement; and from thence the case of least possible inclination was deduced. For the periodic time—although perhaps it may be easier to calculate than to weigh the area—I cut out the orbit, and parts of it, as before; not only using the time as given by the two extreme observations, but also as given by other intermediate ones, and then taking the extremes. Thus the whole of the elements of the real ellipse were obtained: and here they are—

Major semi-axis	$a = 3''{\cdot}61736$
Minor do.	$b = 1{\cdot}7673$
Ex-centricity	$e = 0{\cdot}87253$
Position of perihelion	$\pi = 319^\circ\ 46'$
Position of node	$\Omega = 41^\circ\ 40'$
Inclination of orbit	$\gamma = 31^\circ\ 57'$
$\angle$ between nodes and apsides . .	$\lambda = 269^\circ\ 17'\ 30''$
Perihelion passage	$\tau = 1836{\cdot}2$ A.D.
Periodic time	$P = 148{\cdot}2$ years.

I was somewhat disappointed on finding that, after all my care, the period should differ by forty years from my former attempts, though a little consoled on recollecting the causes of uncertainty in this very ticklish condition; nor was I pleased with another point or two. Yet in order to try the value of this set of elements, and form an ephemeris of the object, I cut card-board sectors of the graphic projection to find the epoch and distance at any particular angle; thereby adroitly avoiding the solution of the transcendental equations, which are necessary for comparing these elements with the observations.

The segments were cut,* not to such angles as had been observed, but to such as appeared to have been correct angles at the time of observation; and thus they ran:—

Angle = 160° 52′	A.D. 1720·23	Angle = 320°·0	A.D. 1836·15 *min. dist.*	
159°·8	. . 1721·67	233°·6	. 1837·96	
142°·0	. . 1756·95	191°·5	. 1843·54	
120°·2	. . 1804·04	182°·6	. 1846·92	
102°·9	. . 1822·18	182°·0	. 1847·25	*Predictions.*
97°·4	. . 1825·25	178°·0	. 1849·37	*Predictions.*
83°·5	. . 1830·14	175°·0	. 1851·39	*Predictions.*
78°·1	. . 1831·30	172°·0	. 1853·69	*Predictions.*
62°·8	. . 1833·23	169°·0	. 1856·94	*Predictions.*

These results appeared to represent the observations pretty fairly as to the angle, and the distances promised to do equally well, but they were not compared, because the error in Bradley's observation was accidentally unconsidered; yet we may judge roughly, that the correction suggested of 10° would increase the period and diminish the inclination. As there were now some symptoms of coming up with the chase, I resolved to trim a little closer, and attempt to form an orbit from the Bedford measures—1831 to 1847—only. I was quite aware that in the present state of the question this attempt might not be deemed altogether legitimate, since the problem is still held to require the united products of all the extra-meridian observatories: but, being desirous of ascertaining where we should be had I been the only watcher of the phenomena, the experiment was made without the least intention of undervaluing or slighting the observations of others. This scheme gave for the apparent ellipse a major semi-axis = 2″·902, with its angle of position = 141° 30′, and a minor semi-axis of 1″·698; the real ellipse being—

* I have had very powerful aid for carrying the weighing process to the greatest nicety of which it is capable; having been furnished with large sheets of card-board made as nearly homogeneous as possible, by Mr. Dickinson, of Abbott's Hill, F.R.S. the well-known and skilful proprietor of the extensive paper-mills near Hemel-Hempstead: and Mrs. Somerville kindly presented me with a singularly delicate balance, made by Robinson, of Devonshire Street, under the immediate eye of the late Dr. Wollaston.

Major semi-axis	$a = 3''{\cdot}345$
Ex-centricity	$e = 0''{\cdot}8682$
Perihelion	$\pi = 140° \; 30'$
Position of Node	$\Omega = 40° \; 44'$
Inclination of orbit	$\gamma = 30° \; 36'$
Distance of perihelion from node on the plane of the orbit . . .	$\lambda = 278° \; 26'$
Date of perihelion	$\tau = 1836{\cdot}5$
Periodic time	P = 135 years!

Another more ex-centric ellipse which was protracted on a larger scale, with a period about ten years longer, would have satisfied the observations almost equally well with this; but the above set of elements meet the older ones more fairly. Still the periodic one hundred and thirty-five years is certainly curious, as being within all the former limits, while τ is in excess. Such an unexpected result indicated something not yet in its proper place; and it became a question whether we are, or are not, to admit the reality of the star's apparent singleness in 1836, as observed by Sir John Herschel and myself. If it be admitted, it becomes a matter of doubt whether any orbit can be found to represent all the data, without supposing some extraneous perturbations about the time of perihelion.

While pondering upon these matters, I received the welcome present of Sir John Herschel's truly important volume of Cape Observations, in which the re-investigation of the orbit of γ Virginis, by a strictly careful examination of all the recorded measures, forms a very interesting point. There the whole details are so ably sifted, that no one interested in the matter should rest till he has read it: but to others it may be told, that Sir John has now abandoned the large elliptical orbit which seemed to be necessary to include the observations of Bradley and Mayer; and, having rejected these data, has adopted the angles of position taken for the epoch of 1781·89 when it was first measured by his father, and that of 1845, which was measured by myself, as the extreme epochs. This able and indefatigable astronomer had already told me that the change of principle in the process he had recommended, as before referred to,

mainly consisted in using the angle θ as the independent variable, and interpolating and calculating t (the time) from it; by which means the solution of the transcendental equation, $nt = u - e. \sin. u$, is avoided, as u is given by $\tan. \frac{1}{2} u = \sqrt{\frac{t+e}{t-e}} . \tan. \frac{1}{2} \theta$. The obtained elements of this searching investigation are—

Ex-centricity	e =	0·87952
Inclination to the plane of projection .	γ =	23° 35′ 40″
Position of ascending node	☊ =	5° 33′
Angular distance of perihelion from node on the plane of the orbit, or true angle between the lines of nodes and apsides .	λ =	313° 45′
Epoch of perihelion passage	τ =	A.D. 1836·43
Periodic time	P =	years 182·12

Sir John judiciously sums up by saying,—"Comparing the orbits which seem entitled to most reliance, it appears certain that the eccentricity lies between 0·855 and 0·880, the inclination between 23° and 27°, the perihelion epoch between 1836·20 and 1836·45, and the period between one hundred and forty and one hundred and ninety years."

In the meantime γ Virginis had again become an object of very easy measurement; and the results now obtainable are likely to be as trustworthy as our present micrometric power will admit of. And indeed it is in good keeping, being closely attended to in several parts of Europe and America; while the zealous Captain Jacob will not allow it to pass unobserved in India. These are my own additional data—

Position	179° 31′ (w 8);	Distance	2″·8 (w 5);	Epoch	1848·36
——	178° 37′ (w 8);	——	2″·9 (w 6);	——	1849·31
——	177° 02′ (w 7);	——	2″·9 (w 5);	——	1850·28

Having thus watched this extraordinary system for upwards of twenty years, and observed it pass through so important a phase of its entire revolution that I have actually measured the companion in each quadrant of the

circle, I prepared to close my telescopic observations upon it with the angle and distance of 1850. But, as the occasion was one of great interest to me, I wrote to several friends possessed of powerful instrumental means, begging of them to obtain sets of measures and oblige me with the results, in order to afford evidence, that the opinion I had expressed of all present observations approximating near to each other, might be tested. Urania, however, does not always command her votaries properly; and, at the due season of apparition, those scenes redolent of mortality and gas were unhappily preferred by one or two to the fresh air of the observatory. Moreover, Mr. Hind had overworked himself, and was unwell; while the instrument of one of our very best astrometers, the Rev. Mr. Dawes, was lying dismounted. Two of my correspondents responded cheerfully to the call, and I append their fruits:—those of Mr. M. I. Johnson—from a mean of six evenings—were taken with the new Oxford Heliometer, although it was then but just mounted, and the manipulation of it hardly attained; and those of Mr. Arthur Kett Barclay were observed under powers of 277 and 300, with a fine six-inch refractor of above eight feet focal length on a German mounting, driven by clock-work—

Johnson . .	$\angle$ of Position 179° 45′;	Distance 2″·76;	Epoch 1850·20.
Barclay . .	——— 178° 07′;	——— 3″·09;	——— 1850·32.

While gazing at the small companion which follows γ nearly on the parallel, I have more than once been struck with a sensation that another minute star was in the field; but even the idea was evanescent. To settle the question indisputably, I requested of both Lord Rosse and Mr. Lassell to search for me, with their gigantic reflectors: and the result of their kind examination is, that no star exists between the binary pair and the little follower.

Having again weighed an orbit from my own measures brought up to 1850, with special care in leading the curve through the epochs of the projection, I obtained a period of one hundred and sixty-eight years. From the sectors produced, the prediction angle for 1851·5=176°, to test which I again

applied for comparing observations to some of my astrometric friends, whose replies, being very illustrative of this portion of the Story, I subjoin. The first in date (Wateringbury, 25th March, 1851) is from the Rev. W. R. Dawes:—

I fear you will think I have quite forgotten your request that I would send you a measure of γ Virginis as soon as practicable. You will see however that this is not the case: but at the same time, I must put your faith in my veracity to the stretch by affirming that the measures now sent are the first, and the only ones, I have been able to procure this year! After I saw you a tremendous cold confined me for some time to the house; and being accompanied by unusual oppression on the chest, I found it necessary to be cautious of long exposure to the cold or night air. Then a series of bad starlight nights occurred, several of which clouded over early; and two or three tantalized me with a view of γ Virginis, more like a great oval nebula, or rather a silk-worm's cocoon, than any object measureable as a double star. I really thought it would be insulting to put on record, by attempted measurements, the appearance of the elegant creature when suffering from such an awful shivering fit as produced a horrible deformity; completely amalgamating all her features into one shapeless mass. So I very unwillingly closed my eyelids (shutters) against so sad a spectacle. Last Friday night however, after watching the formation and partial dispersion of hazy clouds for several hours—feeling assured that the air ought to be fine if the cloud would but take itself off—while looking at γ Leonis, I was amazed and delighted with a rather sudden tranquilizing of the image, which left nothing to be desired in the way of definition. I was using at the time a wheel of double convex lenses, and was aware I had got a pretty high power on; but having been turning the wheel about, I did not know which lens was in use. I thought, however, it was the highest but one, No. 5, power 641; so exquisite were the discs, with a single almost quiet ring round each, that I thought I would give the wheel one more click, and try No. 6, power 903. When behold, on giving the aforesaid click, I found I was already using 903! I instantly detached the eye-piece and applied the micrometer; and being duly pinned and loaded with power 500, levelled at the other γ; when lo! before I could get her fairly in focus, a cloud began to form over her; and, being determined not to be cheated if I could help it, I employed about an hour in getting three angles, and four distances, as the star appeared by glimpses in the chinks between large masses of cloud. It was worth while, however, for the results are good; and therefore I have pleasure in offering them as follows:—

1851·217, Position, = 176°·58; Distance, = 2″·982.

Though I have recorded, or rather given you, the angle as south following, the northern star was noticed as being certainly the smaller: which I observed to be the case also throughout the apparition of 1848.

The next is from Lord Wrottesley (Wrottesley Hall, 18th April, 1851):—

Having at last succeeded in getting ten more very capital measures of γ Virginis on a very

favourable night, I no longer delay sending the results to you, and, as I promised, I send you the original entries of the observations, as read off from the instrument. The general result is,—

ANGLE	$= 175° 55'$
with probable error . .	$= 3'·65$
and weight	$= 75$
DISTANCE	$= 2''·911$
with probable error . .	$= 0''·015$
and weight	$= 107$
MEAN EPOCH . . .	$= 1851·172$

The probable errors and weights are computed by the formulæ,

$$\text{Position} \quad . \quad . \quad . \quad = \frac{·4549}{n(n-1)} \times \Sigma . \epsilon^2$$

$$\text{and weight} \quad . \quad . \quad = \frac{1}{\mathrm{P}^2}$$

The third letter is from Mr. Isaac Fletcher (Tarn Bank, Cockermouth, 17th June, 1851), describing the instrument with which he obtained the measurements—

1851·401, POSITION = 175° 58′; DISTANCE = 3″·047.

I have much pleasure in embracing the earliest opportunity to reply to thy note of the 14th instant.

The telescope employed in procuring the measures of γ Virginis, which appear in the May No. of the Notices, and which I employ in all my double-star operations, is an achromatic refractor of about 6 feet focus with a clear aperture of 4·14 inches.

The mounting is almost precisely similar to that of thy $8\frac{1}{2}$ foot equatorial, illustrated and described in the "Cycle."

The polar axis is 9 feet long, 9 inches square at the middle, and 7 inches square at the ends. It is made of 4 planks of mahogany, screwed together and bound internally. The hour and declination circles are each 20 inches in diameter, and read by verniers, the former to 2^s of time and the latter to 10″ of space.

The defining power of the object glass is first rate; it brings out the 5th star in the great nebula of Orion, and shows with distinctness the companions of ζ Herculis and δ Cygni. The power employed in measuring γ Virginis is 300.

And, finally, Mr. J. F. Miller, of Whitehaven, having watched γ Virginis

into daylight, and gained the last measures of her present apparition, favoured me with the following communication, dated July 19th, 1851:—

I have not long put my instrument to micrometer-work, and, being desirous to get an observation of γ Virginis before it is lost for the season, I have secured two sets of measurements, which I send you, as I know you are particularly interested in this remarkable star. I do not suppose you will consider them of any value, but you will see how they correspond with those of other observers. The observations in position I believe may be relied on as trustworthy.

Micrometrical measures of γ Virginis taken at the Observatory, Whitehaven, with a six-foot achromatic equatorial, 4·1 in. aperture, driven by clock-work. Micrometer by Simms; position circle 5 inches diameter:—

		Observations.	Position.	Distance.	Observation.
1851, June 22	.	8	175·50	,,	,,
1851, June 26	.	7	175·58	3″·040	8

The telescope is exactly the same size as Mr. I. Fletcher's, Tarn Bank, Cockermouth; the two have been tried together side by side, and no difference in performance was perceptible. I readily saw the *comes* of ζ Herculis on the 26th June. λ Ophiuchi is comparatively easy even at this season. My instrument is mounted precisely like that of Ross in the Great Exhibition.

Meantime Mr. Hind had kindly consented to undertake another orbit from my observations only, by a proceeding modified from his last: and it was somewhat satisfactory, to have the discoverer of four new planets at work in cooperation. On the 8th of last April he wrote to me in these gratifying terms:— "I forward the results at which I have just arrived, from a discussion of your observations of γ Virginis; but, not having yet been able to compare them fully with the data, I must ask you to regard them with some indulgence. For my own part, I am really astonished at the very close resemblance between these elements and those obtained from a discussion of all the observations, including Bradley's and the elder Herschel's. It speaks volumes for your admirable measures, and is the more remarkable, as I have not used any others or looked at any others for this purpose; in which, I believe, I was carrying out your wish."

Here, to my great satisfaction, I found a retrograde annual motion of 2°·0987 at the epoch, coinciding exactly with elemental deductions; which,

with certain other orbital similarities, led to the conclusion that we had now positively passed the threshold, and gained an insight of the true elements. As I had the pleasure of seeing Mr. Hind soon after he wrote, we talked over the case, and considered that it constituted a fact which some of the stellar inquirers would like to be acquainted with; and, as these sheets are only destined to a limited circulation, we agreed upon the eligibility of his communicating it to the Royal Astronomical Society, at their meeting on the following evening, April 11th. This is the statement, as copied from the Minutes, and inserted in vol. xi. No. 5, of the Society's Monthly Notices :—

On the Elements of the Binary Star γ Virginis, resulting from a Discussion of the Measures taken by Capt. W. H. SMYTH, R.N. between the years 1831 and 1850. By J. R. HIND, Esq. Foreign Secretary.

It is well known to the members of the Royal Astronomical Society, that amongst the stars observed for the Bedford Cycle by Captain Smyth, the interesting binary system γ Virginis occupied a prominent place. During the period included by the Bedford measures, a very critical and important part of the orbit was passed over, and great pains were bestowed upon the observations to render them as accurate as the nature of the object would permit In 1831 the component stars were separated about $1''\frac{1}{2}$, the smaller one being situate in the north following quadrant about 12° above the parallel of declination. From this position it was watched by Captain Smyth during its passage through the same quadrant, the central distance diminishing each year until in the early part of the year 1836 the star was pronounced single under the best atmospheric conditions. Before the close of the spring the Bedford telescope again afforded indications of duplicity, and two nights' observations showed that the companion had just completed a fourth part of its orbit, its position being now 12° north preceding the principal star. In 1837 a further change of no less than 83° in the same direction had taken place, the *comes* lying in the angle 265° at a distance of rather more than half a second of arc from the primary. In 1847 Captain Smyth found it still on the preceding side, but at a central distance of $2''\cdot6$, and his observations early in the year 1848 showed that it had just passed the vertical point, the measures yeilding an angle of $179^\circ\cdot5$; and at the date of the last observations in 1850, the angle had further diminished to $177^\circ\cdot1$.

It thus appears that the whole series of measures taken with the Bedford telescope include a change in the position of the companion-star of 260°, or nearly three-fourths of a revolution, extending, as before remarked, over a very important part of the orbit. The question, therefore, naturally suggests itself, whether an investigation of the elements from this series of measures to the exclusion of all others, might not be one of some value, as showing, by comparison with elements founded upon the whole of the measures of other astronomers, including the valuable alignments of Bradley and Pound in 1718 and 1720, what kind of dependence we may place upon elements for other binary systems computed under similar circumstances, where, during the interval between the

earliest and latest observations, a portion only of the ellipse has been described, which is to be traced chiefly from the measures of one observer.

In the present instance the investigation promised to lead to results of especial interest; the measures of γ Virginis, published in the Bedford Cycle, were taken by one of the most experienced observers of the present day in this particular department of astronomy, were made throughout with the same instrument, and under the most favourable conditions as regards the state of the atmosphere, the powers employed, &c. With data derived under these promising circumstances, an orbit fairly approximating to the true one (or to that which we have strongest reason to rely upon) might be expected as the result of their discussion; but I confess I had no idea that this series of measures (leaving untouched, as it does, the more distant part of the apparent ellipse when observations are made with comparative facility and proportionally greater accuracy,) would produce a set of elements bearing such close resemblance to those of Sir John Herschel, which, having been calculated upon the whole course of observations, on a method possessing peculiar recommendations, we may fairly presume to be the most exact system at present in the hands of astronomers. For the sake of immediate comparison the two orbits are subjoined together:—

Elements of γ Virginis.

	I. From the Observations of Capt. W. H. Smyth.	II. Sir John Herschel's last Elements.
Perihelion Passage	1836·40	1836·39
Position at Perihelion	323° 50′	322° 12′
Ascending Node	20° 34′	28° 42′
Inclination to Plane of Projection	27° 23′	30° 39′
Angle between the Lines of Apsides and Nodes upon the Orbit	300° 13′	290° 30′
Excentricity	0·8804	0·8860
Period of Revolution	171yrs·54	183yrs·14

Motion in the Orbit—*retrograde.*

In comparing these orbits, it must be borne in mind that in the present case an alteration in the position of the node of 10° has but very little influence upon the computed angles of position; and for this reason the node and the angle between the lines of nodes and apsides cannot be exactly ascertained. The agreement between the other elements is I think, very remarkable; and as regards the period, the observations of Capt. Smyth furnish us with the time of revolution of the companion-sun round the other, differing less than twelve years from that which, under existing circumstances, may be regarded as the true one

After having heard this interesting communication read, on returning homewards in company with my friend Mr. J. C. Adams, of Neptunian celebrity, we entered into a discussion of the several orbits of γ Virginis; and I was not scrupulous in pressing him into the question, since, feeling fully per-

suaded that sidereal physics must one day become of the highest paramount interest to transcendental investigators, I am well aware of the advantages of combination. After a few preliminaries, I found him "nothing loath" in the matter, and he undertook to attack the problem after a method of his own. The result I had the pleasure to receive, under date of the 29th of last June; and I hope the details, with a full account of them, will be given at the next meeting of the Royal Astronomical Society. Meantime the following extract from his letter shall form the satisfactory conclusion of this lengthy "Story:"—

I have great pleasure in sending you the results which I have obtained respecting the orbit of γ Virginis, and I feel the more indebted to you for having called my attention to the subject, inasmuch as the problem of determining the orbits of double stars is one with which I had previously only a theoretical acquaintance. The orbit given by Sir John Herschel in the Results of his Cape Observations, was taken as the basis of the calculations, and equations of condition for the correction of the elements were formed by comparing certain selected angles of position deduced from observation with the values calculated by means of Sir John Herschel's elements.

The positions employed are those given by Bradley's observation in 1718, Sir William Herschel's observations in 1781 and 1803, a normal position for 1825 deduced from the observations of 1822, 1825, and 1828, one for 1833 from the observations of 1832, 1833, and 1834, another for 1839 from the observations of 1838, 1839, and 1840, and, lastly, a normal position for 1848 from the observations of 1846, 1847, 1848, 1849, and 1850. The number of these positions being greater by one than that absolutely necessary for the determination of the elements, I at first omitted the equation of condition for 1718, and solved the remaining ones in such a manner as to shew the effect which would be produced in each of the elements by a small given change in any one of the observed angles of position. The result proved that the elements would be greatly affected by small errors in the observed positions for 1781 and 1803, and I therefore called in the observation of 1718 to the rescue, and solved the equations anew, supposing the positions for 1825, 1833, 1839, and 1848 to be correct, and distributing the errors among the other three, according to the rules supplied by the method of least squares, giving double weight to the observations of 1781 and 1803.

The following are the resulting elements:—

Inclination of the orbit to the plane of projection .	25° 27′
Position of the node	34° 45′
Distance of perihelion from the node . . .	284° 53′
Angle of ex-centricity	61° 36′
or ex-centricity	0·87964
Perihelion passage	1836·34
Period	$174^{yrs.}$·137

The following table shews the differences between the observed positions and those calculated from the above elements:—

Epoch.	Observed Position.	Calculated Position.	Difference.
1718·22	150° 52′	151° 3′	— 11′
1781·89	130° 44′	130° 29′	+ 15′
1803·20	120° 15′	120° 43′	— 28′
1825·32	97° 46′	97° 43′	+ 3′
1833·27	61° 16′	61° 11′	+ 5′
1839·36	215° 51′	216° 2′	— 11′
1848·37	180° 6′	180° 6′	0′

A better agreement could scarcely be desired. The observations made about the time of perihelion passage are liable to great errors in consequence of the excessive closeness of the stars, and therefore I did not take them into account in forming the equations of condition.

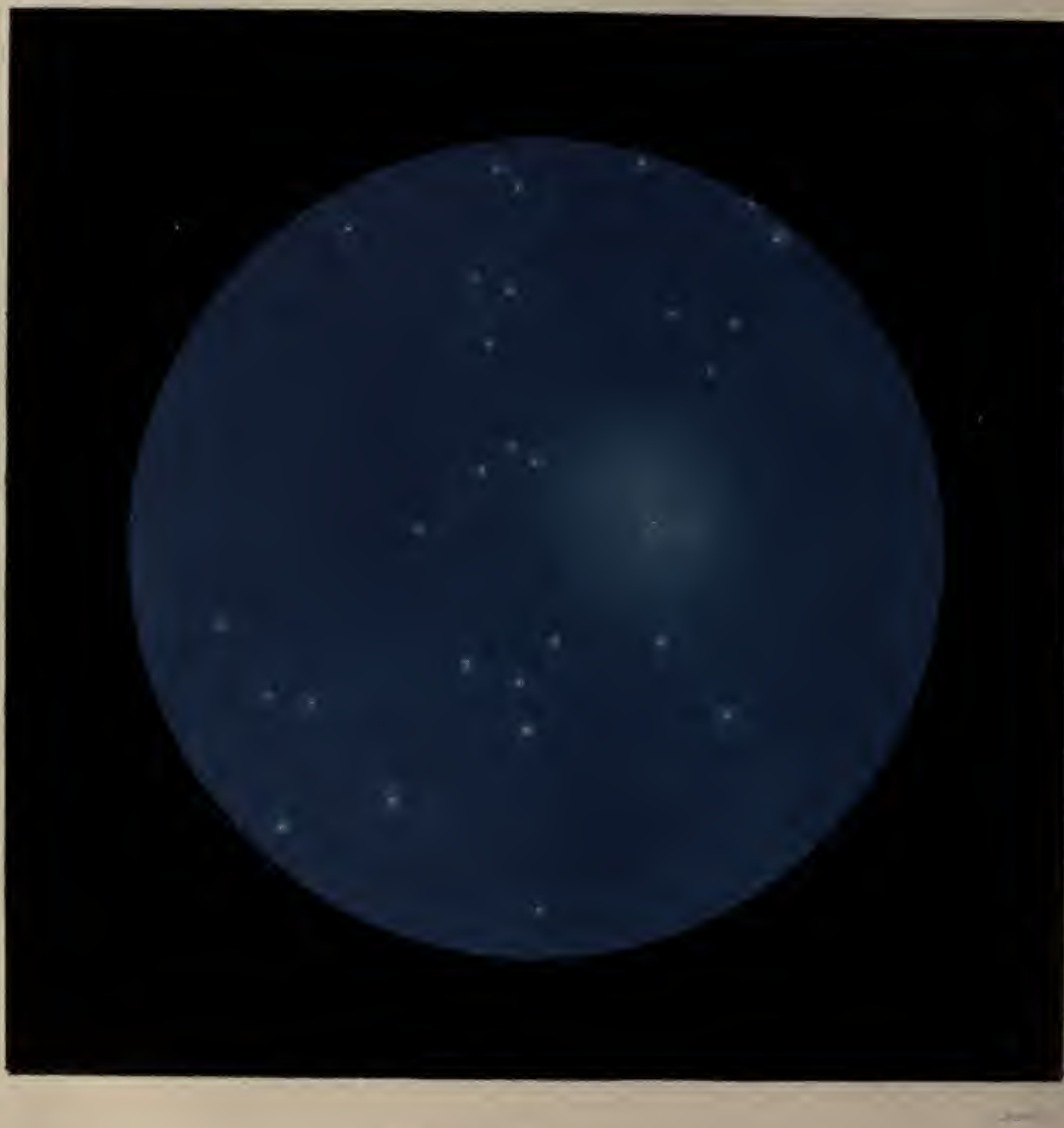
Sir John Herschel was obliged to admit large differences between these observations and the results of his theory, and these differences are considerably increased by using my elements. I am inclined to think that these observations cannot be satisfied without materially increasing the errors on both sides of the perihelion passage.

My elements agree very well with the latest observations which have come to my knowledge, as is shewn by the following comparison:—

Observer.	Epoch.	Observed Position.	Calculated Position.	Difference.
Lord Wrottesley .	1851·172	175° 55′	175° 52′	+ 3′
Mr. Dawes . .	1851·217	176° 35′	175° 49′	+ 46′
Mr. Fletcher .	1851·401	175° 58′	175° 34′	+ 24′

§ 8. OF ENCKE'S COMET.

A detailed account of this gaseous wanderer will be found in the first volume of my Cycle of Celestial Objects; but, as a plate of its appearance on the 22nd of September, 1848, when caught up by my son, Professor C. Piazzi Smyth, with the Hartwell telescope, has been prepared for this volume, a few discursive remarks may be added. When found, the comet was so faint as to



ENCKE'S COMET

As seen at its re appearance, on the 22nd of September 1848

At the Hartwell Observatory.

require a large telescope and a practised eye to see it; and even then it appeared only as a dull nebulous spot about three minutes in diameter, a little condensed towards the centre, and shaded off indefinitely at the edges. It was best seen with the eye-piece powers of 50 and 22 times, and tolerable places were obtained by an eye-piece armed with a broad bar instead of wires, so as to render the gazer independent of an illuminated field of view. *(See Plate XIII.)*

At the very name of comet what a host of associations and ideas arise; what a mass of human errors and perversities does the history of cometology exhibit; what fear and dread have those wanderers so needlessly inspired! Never did popular prejudice adopt more unlikely engines for producing the threatened destruction of the world: without light or heat of their own, without any solidity, and without appreciable weight, how utterly powerless they must be for good or for evil!

We now understand them to be as orderly members of the solar system as the planets: like them, and yet different from them, bearing the same relation to them that birds do to animals, both denizens of our earth, but the former able from their lighter nature to rise and perform flights in a medium into which the latter may never elevate themselves. So the comets—circulating like the planets round the self-same luminary, yet not affected by their grosser weight, take flights above and below the ecliptic at all angles and in all directions; and with velocities and ex-centricities that seem for ever to be denied to the others.

Some have attempted to make out a connexion between planets and comets: and there were even hopes, before the discovery of Uranus and Neptune on the one hand, and of small comets of short period on the other, that on the outer confines of the system the ex-centricities of planets there to be found might approximate and mingle with those of comets. Recent discoveries have, however, shewn the outermost planets to have the least ex-centricity, and the outermost comets the most; each of these respective species thus shewing no tendency whatever to any amalgamation. But it is far more in the physical features of the comets, than the character of their orbits, that

they differ from planets: and the latter's motions are understood, while the former's qualities are still as imperfectly known as ever they were in those days when they spread alarm and dismay amongst nations.

That so little advance has been made in this department seems to be due chiefly, among those causes which we can modify, to too much having been attempted; to inquiries having been made into matters not strictly within the reach of science. Thus, it was not enough to make statistical registers of the various genera of comets, and to investigate the routine of changes which each undergoes in the various points of its orbit, but men must needs account for how a comet was created, and what purpose it was subserving. In the dark ages these purposes were to foreshadow the deaths of kings, to indicate revolutions and wars, and—when these ideas were dissipated before an advancing philosophy—frosts, storms, heats, droughts, &c. took their place. These, again, have vanished before the onward march of science; but, such is the perverse vitality of error, that men still think themselves bound to supply some cause and some purpose for the existence of comets. Thus, in the excellent work recently published under the title of Outlines of Astronomy, § 554, the illustrious author says,—"Even now that we have ceased to regard their movements as irregular, or as governed by other laws than those which retain the planets in their orbits, their intimate nature, and the offices they perform in the economy of our system, are as much unknown as ever. No distinct and satisfactory account has yet been rendered of those immensely voluminous appendages which they bear about with them, and which are known by the name of their tails (though improperly, since they often precede them in their motions), any more than of several other singularities which they present."

Here now there seem to be far more stringent requirements than are exacted in the case of the planets; for who has ever thought it a drawback on our knowledge of planetary astronomy, that we did not know the office which these bodies perform in the economy of the system? Enough for us, then, that we can determine with greater exactness every year, their distance, size, weight, the form of their surface, with the motions and characteristics of their atmo-

spheres; and the sooner we apply ourselves to steadily accumulating similar data respecting comets the better; for certain glimpses of the wished-for desiderata may then appear of themselves. Royal roads and short cuts have, however, seductive charms for the despisers of induction: and I will here give some passages of a letter lately written (August, 1850), by an Assistant-Astronomer in a standard observatory, as a sample of side-wind philosophy:—

Je m'occupe avec les sciences physiques et j'ai fait quelques découvertes très intéressantes, dont vous verrez bientôt l'une qui exprime la cause du magnétisme terrestre.—J'ai trouvé aussi un système pour supprimer les incendies. Ce système a été déja approuvé par le Comité "select" de Woolwich, et à present je m' occupe à le mettre en exécution.—J'ai trouvé que la terre et les planètes subirent plusieurs périodes géologiques, et pendant chaque période des ages sont parcourus; qui se distinguent par leur températures. Le nombre des périodes parcourues par chaque planète est different, quoique elles ont été produites par le soleil à la même époque. Maintenant, les planètes parcourent des ages différentes. Saturne parcoure son age glaciale, Jupiter son age temperé, et Mars son age torride, la Terre se trouve dans son age temperé. Ces ages dépendent de l'épaisseur de l'atmosphère, qui se forme par la décomposition de l'eau. L'azote n'est pas un corps simple, mais un composé de 2 hydrogène et $1\frac{1}{2}$ oxygène. 4 atomes d'eau $= 4\,O + 4\,H = O + 2\,(1\frac{1}{2}\,O + 2\,H) = O + 2\,A\,2 =$ air. Ainsi les mêmes elements produisent l'eau et l'air.

Les comètes sont des atmosphères détachées en deux moitiés par les poles des planètes à la fin de chaque période géologique, ou au moment de cette catastrophe par la séparation de l'atmosphère, les corps organisés cessent de vivre, la température baisse, et les eaux accumulées dans la zone torride par la pression de l'atmosphère dans les latitudes supérieures, ou son épaisseur était la plus grande, se déchainerent, et elles formerent des torrents dirigés vers les pôles, qui apportèrent les débris des terreins pour ensevelir les cadavres dont la surface de la terre était jonchée. On a été étonné ici dans les musées quand on a entendu qu'il n'existe pas des fossiles d'animaux terrestres dans la zone torride.—Les élémens des comètes sont les mêmes que ceux de l'atmosphère, 1° de l'eau, 2° des vapeurs, et 3° de l'air. Ainsi les comètes ne sont que des vents de l'espace.

Here is a precious theory, built up without a single fact, and at variance with all experience! First of all azote, suspected to be a compound gas, but never yet proved to be so, has its composition exactly laid down from fancy, so as to agree with a supposed easy plan for nature to manufacture the gas on a large scale. Then we come by a jump to the comets, which are portions of the atmosphere detached from each pole of the earth, at stated periods. As to how this detachment is brought about, why it should be, and when,

not a glimpse is given; nor of how the detached air is at once to take upon itself the peculiar motions and characteristics of a comet, so excessively different to all that the body of air had been accustomed to, when still accompanying the earth. All these difficulties are, however, overlooked, and the notable conclusion is at length come to, that the elements of comets are the same as those of the atmosphere, and that thus comets are but the winds of space!

If, instead of such constituent principles as these, some additional good honest elements in the shape of perihelion distance, excentricity of orbit, &c. of comets had been given, some real approach to a knowledge of the physical characteristics of these bodies might have been obtained.

Investigations into the orbits of comets can fortunately be pursued without any knowledge of their form and size, by mere reference to the point called the nucleus; all the sensible weight of the body is so completely centered here, that, however much further the body may extend on one side than on the other, it makes no difference, no sensible difference at least, in the position of the centre of gravity and of motion. With the planets, we may either observe the centre, or the two limbs, and the mean of these will be seen to give the centre, but it is far otherwise with the comets: at the tail side the body may extend sixty to one hundred degrees from the nucleus, at the other side only one-fourth of a degree; but yet the nucleus moves as if wholly independent of all that excentric body. This body, both the tail part and the denser parts about the nucleus, called variously the coma or the head, and often mistaken for the nucleus itself, are constantly altering in size and form; the nucleus is the only portion which remains constant; it is infinitely small in size, is seen only as a minute stellar point, and to this alone the attribute of solid matter can attach. To this nucleus proper (not the head, as noticed by old observers) no sensible magnitude has ever been attached, and every succeeding improvement in telescopes further limits the size which it can possibly be of. The smaller comets do not show any apparent nucleus; the existence of one, however, though too small to be seen even in our best telescopes, may always

be inferred from the tendency of the gaseous matter to concentrate round one part, and so form the head, or at all events to indicate the referring point for observation of the place and orbit of the comet.

Both the nucleus and the gaseous semi-transparent body, shine by reflected light, as proved by Arago's polarizing experiment, and cannot therefore be supposed to have any notable temperature of their own; certainly not any heat of incandescence. The small weight that the nucleus can possibly be of, is indicated sufficiently in mere observation by its excessively small dimensions; and the little weight of all the body is shown in its transparency; for it can be seen through in every direction, and so easily, that a thickness of sixty thousand miles of it (according to Sir John Herschel in the case of Biela's comet) does not sensibly affect the brightness of the smallest stars. Hence there was probably not so much substance and matter in all that depth and thickness of comet as there would be in a depth of a few feet, or even inches, in an ordinary cloud.

Comets were anciently divided into twelve classes, in this fashion—bearded, torch-like, sword-like, tun-like, javelin-like, horn-like, &c. &c.—and even still a distinction is kept up between the large comets and the small ones, or those with tails and those with none: but this would seem an unnecessary division, for the one sort merge so imperceptibly into the other, that the features of each may be represented merely by different degrees of the same form or quality.

Comets of long period, as that of 1811, with a period of two thousand five hundred years, are generally large; the nucleus of this was distinct, the tail long, broad, and bright; and, being circumpolar, remained constantly visible for upwards of ten months. And comets of very excentric orbits, as in the instance of 1843, which had hardly any perihelion distance, have very excentric bodies, or long narrow tails, this appendage being at one period 70° long by 1° broad.

Comets of short period and small excentricity, as Encke's, with a period only one thousandth of that of 1811, have small bodies, and these not very

excentrically dispersed about the nucleus. Thus Encke's, as exhibited in the engraving, presents only a small oval mass of vapour, without any visible nucleus, but with a sensible concentration towards the place of it. A small star is shown, as it was seen, clearly and brightly, through the very thick of the comet, and must not be confounded with the nucleus. The rest of the stars are inserted rather to show the telescopic characters of them, and their distinction from the comet; they so sharp, precise, and pungent,—and it so weak, diffuse, and ill defined. While planetary bodies may be fixed in space by means of their boundaries, may, in fact, be defined in the strict geometrical sense of a definition, the comet admits of no such fixation, but recourse must be had to the new natural-history method of the type; which, instead of drawing the circumference of a circle, and stating all that it excludes, rather fixes the place of the centre of it, and gives all that it eminently includes: so the place of the comet cannot be defined by its borders, but by the position of its centre, or we may say the excentric focus, carrying the nucleus and the more condensed matter immediately around it.

Although I have referred the reader to the account which I have given in my Cycle, of Encke's comet, still the interest attached to its discovery, or rather to the determination of the nature of its orbit, and consequent rate of its motion, warrants a Parthian glance. As Encke's investigations produced the surprisingly short period of one thousand two hundred and eight days, a retrospective view was obtained, and by trying back it was found to have been seen in 1786 by Messier—*Le Furet des Comètes*, by Miss Herschel in 1795, and by two or three observers in 1805: but it was so small and so difficult to be seen even with telescopic aid, and the duration of its appearance was so brief, that the only wonder is, that it did not remain unnoticed in the heavens.

The whole astronomical world hailed with the greatest delight the discovery of a comet of short period, one so very short as to keep the body constantly within, and far within, our planetary region, thus bringing it frequently to our view, instead of driving it to such distant regions beyond, as to lead some men to think that the other focus of the orbit must be formed by some star,

or remote sun. But, though it might be interesting, we can neither lug in the argument, nor the question as to the rare elastic ethereal medium diffused through universal space (which its frequently observed returns somewhat countenance, to the great joy of the undulatory theorists), on the shoulders merely of a drawing of the physical appearance of the now well-known vagrant. The same delicacy, however, and wish to confine ourselves to our own subject, will not prevent an allusion to the contraction observed in the size of the body of the comet on approaching the sun; for with this is intimately bound up all and every change and characteristic in the wanderers.

Hevelius had first of all noticed that comets (large ones, of course, visible to the naked eye) contracted in size on approach to the sun, and *vice versâ*; but the observation was strangely overlooked, and precisely the contrary opinion gained ground. At length, a few years ago, M. Valz pointed out that Encke's comet regularly contracted in diminishing its perihelion distance; this contraction he attributed to the pressure of the dense ether in the neighbourhood of the sun. This cause Sir John Herschel showed to be insufficient, and he supplied a better, but here the matter stopped; and so far from applying the same theory to large comets, the contrary law was still supposed to obtain with them; they were considered to "throw" or "shoot" out their tails in approaching the sun; and to retract them, if not to lose them altogether, on leaving him; thereby proving them to be an entirely different genus to the small comets.

More exact observation, however, aided by the fortunate appearance of so extreme a comet as that of 1843, and a calmer consideration of the facts of the case, independently of any previous theoretical ideas, has shown that all comets decrease in size as they come to perihelion; that the length of the comet varies in a certain proportion with the radius vector; that, consequently, in the case of a large one like that of 1843, with hardly any perihelion distance, it becomes at that part of its orbit, where it remains but for a moment, so very dense, as to be capable of being seen in the day-time, yet expands so rapidly after that, as to be soon lost sight of again even at night. In the

case, however, of a comet like Encke's, small in itself and with little excentricity, it never experiences much concentration of substance, and therefore never becomes particularly bright.

That comet's tails should have been supposed to be produced at perihelion, seems only to be attributed to their becoming then more visible than at other times; they are then nearer to us, and hence seen under a larger angle; they are closer to the sun, and consequently illuminated with a stronger light; and thirdly, they are then more dense, and therefore capable of reflecting greater light. Partly, perhaps, also owing to the quickness of the comet's motion at perihelion, by which it is transferred in twenty-four hours from the daylight part of the sky to the night; and thus a tail, before existing, but not seen, by reason of the light back-ground, is said, when seen brightly on the night-sky, to have been suddenly shot out there: for, be it remembered, no one ever pretends to have seen it shooting forth.

Again, as to the phenomena of the form of a tail, as far as such an ill-defined shape is concerned, this is pretty clearly proved by the comet of 1843 to be an affair of phase; and there is strong reason to believe that every comet is a complete elliptical figure, with the nucleus in the focus nearest to the sun. The phase becomes strongest, or the tail-appearance most manifest, in large and dense comets; and least in small and diffuse ones; or in those which may be concentrated within a very small space when their perihelion distance is very small. But this is not exactly the place to explain the whole range of phenomena; it must suffice to point to our figure of Encke's comet. Its smallness, together with its diffuseness and little excentricity, causes the illuminating rays of the sun to strike upon it, and be reflected back to us with almost equal intensity from every part (independently of course of any inherent and proper form in each portion to reflect light as from greater or less density): here, therefore, we see the whole body of the comet; namely, an oval vaporous mass, equally diffuse on every side, and most condensed about one focus, namely, that nearest to the sun.

The drawing attempts to give the comet just as seen in the telescope, with

the view of rendering every one who has the drawing in possession, to be as well circumstanced for judging of the phenomena as those who saw the comet on the night in question. But, nevertheless, the representation falls much too short of what an astronomical drawing should be, of which the necessary accompaniments ought to be—statements of the probable error of the magnitude and brightness of each part. This, however, cannot be attempted in the present backward state of this brauch of astronomy; but the more backward it is, and the more it is neglected by others, the more room for some one to distinguish himself, and perform real good work, in adding to the general stock of astronomical knowledge. Cometography being necessarily joined with the determination of the magnitudes and colours of the stars, I cannot but again recommend both it and them.

§ 9. THE METEOROLOGICAL DEPARTMENT.

My late esteemed friend, John Frederick Daniell, who expired on duty in the Council-room of the Royal Society, observed that "man may with propriety be said to be a meteorologist by nature;" because watching the atmospheric vicissitudes on which he is so dependent not only for his comfort, but even for his subsistence, is a necessary portion of the labour to which he is born. Investigating the weather is but studying the conditions and variations of the air, as influenced by the elements of rest and motion, wind and calm, heat and cold, moisture and drought, together with other similar particulars: still the study is to the philosopher one of interest and delight—to the observer of nature it affords objects of grandeur and sublimity—to the farmer, the traveller, and the physician, it is in some measure a study of necessity, still more to the seaman it is especially and vitally important. But, though these phenomena have consequently occupied the attention of all classes of the community from the earliest ages, it is in comparatively recent times that the

inquiries of Redfield, Reid, Dove, Maury, and others, shew that, capricious as the weather appears to be, it is nevertheless certain that it observes laws as stable and constant as those that govern all other natural phenomena.

The science of meteorology, however, has languished for want of the spirited and pointed aid which is given to other branches of physical inquiry by associated bodies of votaries. Many valuable registers were kept of which the mere numerical mean values were known, while others were entirely lost from want of being classified and reduced. It therefore struck a few amateurs that, in order to secure the advantages of arrangement, publication, and well-concerted combination, an express association ought to be formed; and accordingly, on the 4th of April, 1850, a meeting of some friends of the science was convened by Dr. Lee at Hartwell; where, in the library, they agreed upon a general system of observation, uniformity of registry, systematic communication, and other measures for insuring precision, to the advancement of the aëro-statical branch of physics. At this decisive meeting, the gentlemen present elected Samuel Charles Whitbread, Esq. of Cardington, near Bedford, as their President, appointed an efficient Council, and thus established the present British Meteorological Society. The aim and principal objects contemplated were thus enumerated:—

1. A collection of correct manuscript observations.
2. The publication of tables.
3. The reduction of observations to useful results.
4. A collection of all observations of the same phenomena.
5. The formation of a repository to which observers may consign the results of their labours.
6. The distribution of meteorological papers.
7. The examination and correction of meteorological instruments.
8. The encouragement and promotion of meteorological science.

By turning to page 15 of this work, the reader will see that Dr. Lee had already carefully kept some very creditable barometrical and thermometrical registers; and that an improved system of observing and recording meteorological phenomena had been introduced at Hartwell by Mr. James Glaisher, F.R.S. The instruments now relied upon are as follows:—

I. The BAROMETER is a standard one, made by Barrow under the superintendence of Mr. Glaisher. It is of brass throughout, the scale is divided to $0^{in}\cdot005$, and terminates in a conical point of ivory, which in observation is made to touch the surface of the mercury in the cistern, and the contact is very readily seen by the reflected and the actual point appearing just to meet each other. The vernier subdivides the scale divisions to $0^{in}\cdot002$; it is moved by its rack and pinion till the ray of light passing under the back and front parts of the semi-cylindrical plate carried by the vernier appear just to touch the convex surface of the mercury in the tube.

The tube is $0^{in}\cdot32$ in diameter, the mercury has been boiled within it; the correction for the effect of capillary attraction is therefore $0^{in}\cdot013$ to be applied additionally. The cistern is of glass. This instrument is recorded every day at 9 A.M. and at 3 P.M. At the top of the instrument are three screws, turning in the fixed part of the support for adjustment to verticality: and the readings of the barometer are all too low by $0^{in}\cdot002$ as determined by Mr. Glaisher. All observations of this barometer are increased by $0^{in}\cdot013$ for capillarity, and by $0^{in}\cdot002$ for inside error, and they are also corrected for the difference of temperature of the mercury in the tube at the time of observation from 32°, by the application of the corrections contained in the table for barometers whose scales are engraved upon brass reaching from the level of the mercury to the vernier. In practice one correction only is needed, a special table having been formed based upon the three necessary corrections.

II. The DRY BULB THERMOMETER is mercurial; its scale is divided to 1°. Its index errors have been determined by Mr. Glaisher. This instrument is read every day at 9 A.M. and 3 P.M.

III. The WET BULB THERMOMETER is mercurial; its scale is divided to 1°. Its index errors have been determined by Mr. Glaisher. The bulb is covered with a piece of fine muslin, and near to it, but distant from the dry bulb thermometer, is placed a small cistern of rain or distilled water. A piece of cotton lamp-wick is connected with the muslin, and its end dips into the cistern of water; the water by capillary action ascends, and keeps the muslin on the thermometer constantly wet. This instrument is read every day at 9 A.M. and at 3 P.M.

IV. The MAXIMUM AND MINIMUM THERMOMETERS: the self-registering thermometer for maximum temperature of the air is mercurial, with a transparent bulb; its index is a piece of blue steel wire. Its scale is divided on box wood to 1°. This instrument is read every morning at 9 A.M.

V. The MINIMUM THERMOMETER: the self-registering thermometer for minimum temperature of the air is of alcohol, with a transparent bulb: its index is glass, with a knob at each end. Its scale is divided on box wood to 1°. This instrument is read every day at 9 A.M.

POSITION OF THE THERMOMETERS. At the distance of 58·5 feet south of the house, and on a grass plot, is fixed a post, which carries a revolving frame, similar in its construction in every respect with that at the Royal Observatory at Greenwich. This frame consists of a board four feet one inch and a half wide at the base, and of another board one foot eight inches high, connected with one edge of the horizontal board, and projecting upwards; and of two parallel inclined boards, separated from each other by three inches, meeting the other edge of the horizontal board, and the top of the vertical board. Upon the face of the vertical board are placed all the thermometers in such manner that their bulbs project below the vertical board, and at about four feet above the

ground. Above them is placed a projecting roof, to protect them from the effects of radiation and rain. The frame is always turned round after every observation, so that its inclined side is turned towards the sun.

VI. The RAIN GAUGE is a simple cylinder gauge, eight inches in diameter, and therefore having an area of 50·3 square inches. The height of the cylinder is thirteen inches and a half; at the depth of half an inch from the top, within the cylinder, is fixed a funnel (an inverted cone), of six inches perpendicular height; with the point of this funnel is connected a tube, one-eighth of an inch in diameter, and half an inch in length; a quarter of an inch of which is straight, and a quarter of an inch is bent upwards. By this arrangement the last drop of water remains in the bent part of the tube. The upper part of the funnel, or base of the cone, is made to touch the internal part of the cylinder all round, and it is believed that evaporation is totally prevented. The cylinder is sunk eight inches in the ground. The quantity of water collected is read at the end of every month.

VII. In addition to these instruments, a standard thermometer is placed on the revolving stand, so that, in the event of an accident happening to the dry bulb thermometer, the series of observations would be continued unbroken; and duplicate instruments of all kinds are kept for the same purpose, and nearly all of which have been examined and their index errors determined by Mr. Glaisher.

On every day from the observations at 9 A.M. and also from those taken at 3 P.M. the true length of the column of mercury supported by air, and that portion supported by water mingled with the air, are determined, as well as the true temperature of air, evaporation, and the dew point; the weight of a cubic foot of vapour, the additional amount of vapour required to saturate a cubic foot of air, the degree of humidity, and the weight in grains of a cubic foot of air under its then pressure, heat, and humidity, are determined. All these hygrometrical results being calculated by the use of Glaisher's hygrometrical tables.

The average monthly and quarterly values of all these elements are determined, and they are published quarterly in the Reports of the Registrar General: and the whole of the instruments are frequently examined by Mr. Glaisher, who also examines all the meteorological work in progress.

* * * *

Such is the HARTWELL OBSERVATORY; and such is the nature of various praiseworthy establishments which have lately sprung up in England. May success attend them; for, while they act as an incitement to our public observatories, they are each liable to polish some particular scientific gem. And, beside the positive utility of making and reducing observations, surely nothing can contribute more to the elevation of thoughtful reasoning, and the intellectual

intelligence of man, than the contemplation of the wonders revealed by the OMNIPOTENT; albeit our perceptions can only trace by faint shadowings the vastness of his power and glory. Much is certainly now known; but higher views are in all probability attainable, if the various ramifications of knowledge are perseveringly and properly pursued. It is, in the present day, more obvious than it could have been to Pope, that—

> All nature is but art unknown to thee;
> All chance, direction which thou canst not see;
> All discord, harmony not understood;
> All partial evil, universal good.

THE EARTH AS SEEN FROM THE MOON.

THE MOON AS SEEN FROM THE EARTH.

APPENDIX.

No. I.

A CORRECTION RESPECTING SIR THOMAS LEE, K.B.

On the authority of a large pedigree sheet at Hartwell House, it is mentioned at page 63, that Sir Thomas Lee, the first Baronet, was a Lord of the Admiralty in 1690. But, since that was written, I paid a visit to my friend Sir Thomas Phillipps, of Middlehill in Worcestershire, who freely permitted me to examine his important collection of historical MSS. Among other valuable accumulations, there is a series of Admiralty records and papers extending from 1635 to 1690, containing incidental matters relating to numerous public characters of those days; any of which, he obligingly said, might be copied for my use. Here I soon obtained evidence that Sir Thomas the Knight of the Bath could not have been the Lord of the Admiralty who signed official documents in June and August 1690 and in 1691, seeing that the Knight died on the 24th of February of the former year. It was clearly his son, the second Baronet, who thus officiated, and incurred the sneer of Gilbert Burnet, the celebrated Bishop of Sarum; who in his well-known history, with acknowledged prejudice against a Tory gentleman, declares that "Sir Thomas Lee was a man that valued himself upon artifice, in which he was a great master, without being out of countenance when it was discovered." Now, not having been able to trace the slightest ground for this assertion, after ransacking in many directions, it must be attributed to the occasional taste for "giving a false impression of persons and things" which the right-reverend prelate, according to the testimony of Lord Dartmouth, was wont to indulge in. Sir Thomas must therefore descend to future ages with Charles the First, "one Prior," and other worthies shewn up in the said history:—

> " *One Prior!* and is this, this all the fame
> The poet from the historian can claim ?
> No: Prior's verse posterity shall quote,
> When 'tis forgot *one Burnet* ever wrote."

In venting this honest feeling, Dodsley precursed the caustic North Briton's memorable expression, "His name, Sir, will live, when oblivion shall have rescued yours from contempt."

That 1690 was a busy year, and every government-servant was obliged to "up and be doing;" the King being in Ireland with the flower of the army, and the Queen acting as regent during his

absence under circumstances both trying and perplexing. At this critical juncture, a French fleet consisting of seventy-eight * sail of the line, besides a number of frigates and twenty-two fire-ships, suddenly and unexpectedly pushed to sea, with the threefold design of firstly preventing our Channel squadrons—amounting to, English and Dutch together, only fifty-six line-of-battle ships—from forming a junction; secondly, to encourage the looked-for Jacobite insurrections in London. This movement was so promptly executed by Mons. de Tourville, the French Admiral, that the Commander-in-Chief of our Channel fleet, the Earl of Torrington, was taken by surprise, and consequently fell into hurried measures; still, notwithstanding Bishop Burnet's shot at the "Man of Pleasure," he did as much under existing circumstances as could have been fairly expected. The consternation was general; and the bustle at the Admiralty, as shewn in the following letter to Sir Robert Southwell, may be interesting to those who recall the awkward conflict off Beachey-head:—

S^{r}, *Admiralty Office, 27th of June*, 1690.

We desire you will lay before his Ma^{ty} the following acco^{t}:—

On Sunday, in the evening, the 22th of June, about 7 of the clock, an expresse arrived from the Co'mander of the Crowne, giving an acco^{t} of y^{e} appearing of the French fleete off the Lizard, standing to the eastward, which was forthwith com'unicated to the Earle of Nottingham, and advice thereof sent to the Earle of Torrington, with directions for him to saile with their Ma^{ts} fleete, and to take along with him any other ships (besides those belonging to the fleete) which he should meet with. Orders were likewise dispatched away to Plimouth to Capt^{n} Sanderson, wth the ships there (which are those named in the margin), forthwith to make the best of their way to joyne the fleete; as also that an advice-boate should be sent away from some port in North Cornwall, to endeavour to meet S^{r} Clow. Shovell, or any other of their Ma^{s} ships comeing about from the Irish seas, and direct them to hasten to the fleete. And severall other ships, whose names are in the margin, which were upon particular stations, had orders sent them immediately to repaire to the fleete. Besides which, the severall orders following have been given:—

Swiftsure.
Essex.
Mordant.
Advice.
Sweepstakes.
Kingfisher.
Nonsuch.
Pembroke.

Foresight.
Phenix.
Assurance.
Mary Gally.
Guarland.
Milford.
Julian Prize.

To the Navy Board.

For putting out to sea, with all possible speed, two second-rates and one third-rate at Chatham, and one second and three third-rates at Portsmouth, and also four or five fire-ships at Portsmouth, to supply the places of any disabled ships.

To provide all needful stores in a readiness at Portsmouth, for the re-fitting of any ships that should come in disabled; and S^{r} Richard Haddock is sent away thither to take care for the dispatch of all services at that port.

To the Ma^{r} of the Ordnance.

To cause a quantity of powder, shott, and all sorts of gunner's stores to be gott ready, and shipp'd on board fitting vessels in this river and at Portsmouth, to be sent off to the fleete as there shall be occasion.

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* Charnock *(Biographia Navalis)* asserts, from authority which he submits, that the French fleet consisted of eighty-four sail of the line, besides the smaller vessels; and he gives their names.

To the Comm^r for Sick and Wounded.

To send away some of their number and also chirurgeons to the western ports, to take care of such wounded men as shall be sent on shoare from the fleete.

The strength of their Ma^ts fleete with the Earle of Torrington is (of English) 30 first, second, and third-rates, 5 fourth-rates, 1 fifth, and 16 fire-ships; and we have good reason to believe that there are with them twenty-two Dutch men-of-warr and four or five fire-ships, there being advice come of four Dutch ships joined him since Sunday last.

We send you inclosed a copy of a letter which was rec^d this day from Mr. Dummer, in the Isle of Wight, and of a draught of the postures of the two fleets which came therewith, which we also desire you will lay before his Ma^ty.

We are further to desire you will acquaint his Ma^ty that the Ruby having, before his Ma^ty going from England, been ordered to Plimouth, we have sent orders to the Jersey, which was sent convoy to a vessell with soldiers from Scilly to Belfast, to continue in the Irish Seas in the roome of the Ruby. So we remaine,

Yo^r humble Servants,

Pembroke.
Carbery.
V. Lowther.
R^n Hill.
Tho^s Lee.
Ri. Onslow.
H. Preuman.

S^r Robert Southwell.

Sir Thomas Lee is supposed to have been deeply interested in the Association for recovering treasure out of wrecks, which was certainly assisted by the Board of Admiralty, of which he was a member; but there is no trace of an improper implication therein among the MSS. in the Bibliotheca Phillippica. The points of the case may be thus stated: in the year 1686, a grant under the great seal was procured by the Duke of Albemarle, for himself and others, of a wreck recently discovered upon the northern coast of Hispaniola, and of all the plate and other goods which were or should be taken up from the same, by the Duke or his substitutes, before July 1689; reserving to the King one-tenth part thereof, under a bond of 100,000*l.*

In the year 1687, the parties having fished up treasure to a great amount from the wrecked hull, the same was brought into England by the ship James and Mary, and one-tenth part thereof answered to the King. This drew great attention; and the patentees intending another voyage to the said wreck, a second grant under the great seal was obtained by the Duke of Albemarle, whereby there was granted unto them the use of his Majesty's frigate the Foresight,* with all her

* This frigate had been commanded by Captain Laurence Wright in 1687; but, the Duke of Albemarle being appointed Governor of Jamaica, the Captain was removed into the Assistance of 50 guns, the ship destined to carry his Grace to the West Indies. The Duke did not long survive his arrival; and Captain Wright, who had carried him when living to his government, had also the melancholy honour of conveying his dead body back to England, where it arrived on the 22nd of May 1689.

furniture and apparel, for one year ending in July 1688; the charge of seamen's wages and victuals being to be defrayed by the grantees. In this new instrument, as before, all the plate and other goods taken up from the wreck during the said voyage was granted to the speculators; but the share reserved for the King was increased to one-fifth of the recovered property, should it not exceed 150,000*l.*, and to one-third part, if it should exceed that value. Whereupon the ships of the grantees, together with the Foresight frigate, having taken up valuables to the amount of upwards of 60,000*l.* from the above wreck, the same was brought to England in the year 1688, and the one-fifth part answered to the King, according to the reservation of the specified second grant.

About the beginning of December 1689, and while Sir Thomas Lee was a stirring member of the Admiralty Board, another rich wreck was discovered upon the shoals of the Serenillas, about forty leagues to the southward of the west end of Jamaica: the hull was described as being very large, and overgrown with coral rocks, so as to obstruct the divers; who had nevertheless contrived to take up twenty-three dough-boys of silver, some plate, and many gold beads, without having disturbed the hold. This intelligence excited the speculators, and they having induced the Lords of the Council to solicit the Admiralty for aid, this answer was returned:—

By the Com. for executeing y^{e} Office of Lord High Admirall of Englande.

Pursuant to an Order of the Lords of the Council, dated the 21^{o} instant, requiring our opinion whither one of the fourth-rate friggatts in the West Indies may be spared to countenance and protect their Ma^{ts} subjects at a wreck discover'd upon the Serranillas, about forty leagues to y^{e} southward of the west end of Jamaica, Their Lord^{ps} may please to bee inform'd that wee are not able to judge whither or noe such a friggott can bee spared, not knowing in what posture of defence the severall islands, &c. in the West Indies are, nor in what condition the squadron attending on them is, haveing not had any account from them since their leaving England.

(Signed)

Carbery

Adm^{ty} Office, 26^{o} Aug^{t}, '90.

Tho Lee

J Lowther

H Priestman

Now here there is certainly nothing involving Sir Thomas Lee in the speculation, the indenture of which liberally granted what apparently the authorities had little real power to grant, all and every property from such wrecks, jetsam, flotsam, lagan goods, derelict riches, bullion, plate, gold, silver, coins, bars or pigs of silver, ingots of gold, merchandize, and every other goods and chattels whatsoever. As in duty bound, the lion's share was carefully reserved; but Grotius declares that lawyers act most unjustly in giving the King a right to wrecks, which he stigmatizes as seizing the property of others. So Euripides makes Helen plead:—

Wreck'd and a stranger came I in;
Such to despoil is horrid sin.

No. II.

THE LETTERS REFERRED TO ON PAGE 196.

It will be seen by Baron de Zach's notes upon my letters, that he considered, from Walsh's book, that Captain Dundas and Lieut. Desade were the sole unravellers of the inscription on Pompey's Pillar, in 1801: but Colonel Squire, together with my friends Colonel Leake and W. R. Hamilton, were fellow-labourers in the successful struggle to unravel it. To accomplish this, they visited it on several successive days at the most favourable time, when the rays of the sun first struck obliquely on the plane of the letters. Nor was this, as has been assumed by many, the first discovery of the inscription: it may have been immemorially seen, but we know that it was copied by Dr. Pococke in 1737, or at least "what letters he could make any conjecture of." A few years afterwards, it was attempted by Mr. Hughes, whose *bizarre* characters differ from those of Pococke, and both of their copies are at variance with the original. The first of these will be found in the Doctor's well-known Travels in Egypt, published in 1743,—and the second is in the ninth volume of the Society of Antiquaries' Minutes; from whence I copied the following extract from the proceedings of the Meeting holden on Thursday, the 24th of March, 1763, Lord Willoughby de Parham in the chair:—

The President was pleased to communicate the following inscription, taken from Pompey's Pillar, and transmitted to Lord Charlemont, an hon[ble] Member of this Society, by one Robert Hughes, who, being at Alexandria in the year 1749, attended his Lordship and some other gent. who went to take the height and dimensions of the said pillar; and his Lordship, being obliged to set out for Athens the day after, left it in charge to Hughes, who first made the discovery, to copy the inscription and send it to Leghorn, where his Lordship would meet with it. Hughes accordingly, with much difficulty, and damage to his eyes, made out the following lines; and declares himself ready to attest upon oath the fidelity with which they are copied. As he appears, from the account which he gives of this affair, to be a plain, illiterate man, and that imagination could have had but little share in the framing or conceiving the true ducts of the characters, 'tis possible that, by a steady and close attention, and imitation of the original, he may have effected what, he tells us, many others (more learned we may presume) have in vain attempted. He makes mention particularly of sevl. Frenchmen, to whom he absolutely refused to give any copy of what he had made out; and they could do nothing in it themselves.

It is singular that the French savans, sent to procure whatever might promote science and establish historical data, failed in decyphering these characters; and before their advent, Mr. Edward Wortley Montague had said—"From the inscription I could discover nothing; it is on the west face of the base, but so much injured by time, and I may say too by malice, for the marks of an instrument are plainly discovered effacing it, that one can but imperfectly make out some Greek characters, so imperfectly indeed that no one word can be found." The skill and zealous exertions of the gentlemen above named have altered this.

Both the Baron and myself may appear to have dealt harshly with Mr. Montague; but I certainly regretted that a gentleman of his acquirements and energy should either deceive or have been deceived in respect of the coin of Vespasian. The whole story had been inquired into by Consul-General Salt, who found it was traditionally considered a mere pleasantry. Now for my first letter:—

A bord du vaisseau de S. M. B. l'Aventure,
à Alexandrie, d'Egypte, le 15 *Avril*, 1822.

Puisqu'un vaisseau chargé de fèves part dans ce moment pour Gênes, je profite de cette occasion pour vous faire savoir que je me trouve actuellement ici, où je ne suis pas seul, car les escadres turque, algérienne, tunisienne, tripolitaine, et égyptienne sont mouillées dans ce port, au nombre de cinquante-sept voiles, formant une flotte supérieurement indisciplinée, commandée par un homme de terre, et si détestablement manœuvrée, qu'en entrant dans ce port, avec le même coup de vent avec lequel nous sommes entrés, et pendant lequel nous n'avons pas touché au fil d'une corde, ils avaient perdu deux frégates, trois corvettes, et un brick; près de 700 hommes de leurs équipages ont péri; trois frégates, neuf corvettes et bricks ont été dématés par-dessus le marché.

J'ai commencé mes opérations avec le plus grand succès, car mes chronomètres ont marché infiniment mieux qu'ils ne l'avaient fait l'hiver passé dans le golfe orageux du Syrtis. J'aurai l'honneur de vous communiquer quelques-uns de mes résultats.

* * * * * *

J'ai achevé la levée d'un plan particulier d'Alexandrie (1) avec la permission et la coopération de Mehemmed-Ali, le célèbre Pacha d'Egypte, dont je vous ai souvent parlé.

Il est tout enchanté de mes instrumens; je les lui ai fait porter dans son palais, pour qu'il pût les voir à son aise.

Il était sur-tout ravi de mon grand télescope micrométrique, avec lequel on avait mesuré plusieurs petites distances sur le terrain. Le Pacha mesura lui-même le diamètre du soleil, ce qui surprit extraordinairement ses courtisans. Mehemmed leur expliqua ensuite à quelle distance ils étaient du soleil, etc. . . . Vous me direz, mais ce ne sont là que des bagatelles; mais précisément ce sont ces bagatelles qui me sont d'un grand secours, et qui avancent prodigieusement ma besogne. J'étais souvent plus embarrassée à expliquer un instrument à des personnes qui n'auraient pas dû être ignorantes, qu'à ce Muselman.

Je lui ai dit un jour, que puisque la colonne d'Alexandrie, que je ne puis entendre nommer la colonne de Pompée (2), était un des points de ma carte topographique, et que, son élévation étant si considérable, je pourrais y relever des objets très-éloignés, et qu'à cet effet je voudrais bien y transporter mon grand théodolite. Cette idée ayant fait grand plaisir au Pacha, je fis construire un

grand cerf-volant, au moyen duquel, d'après l'exemple des marins anglais, qui y montèrent les premiers (3), nous y jetâmes une petite corde, puis une autre plus grosse, et ainsi de suite, jusqu'à ce que nous y eûmes hissé et fixé une échelle des cordes fort régulière, au grand étonnement des matelots de la flotte turque. J'en étais d'autant plus satisfait, que j'ai pu porter avec une grande sûreté un excellent instrument sur la pointe de ce magnifique débris de l'antiquité.

Je suis tout-à-fait de l'opinion de M. Sylvestre de Sacy, dans ses notes savantes sur la relation d'Abd Allatif, que cette colonne avait été entourée d'un immense portique, d'où elle avait pris le nom de Amood al Sawary, ou la colonne des pilliers, nom qu'on a corrompu et ridiculement transformé en Pillier de Severus. Je pense de même qu'il est assez bien prouvé que c'est la colonne dont parle Aphthonius,* et de laquelle il dit, qu'elle supportait les élémens de toutes choses, expression qu'il n'est pas probable qu'on l'eût appliquée à une colonne, mais plutôt à ce grand cercle de cuivre, dont Hipparque fait mention, en comparant ses observations des solstices avec celles d'Archimède. De plus, Abd Allatif dit positivement qu'il y avait vu une coupole (environ vers l'an 1200 de J.C.) Ne pourrait-on pas en inférer que cette colonne avait été destinée aux observations astronomiques, qu'elle avait été placée au centre même de ce superbe carré du Serapeum, où probablement avait aussi été logée la fameuse bibliothèque? Quoi qu'il en soit de ces rêveries hypercritiques, il n'est pas moins vrai que j'ai ressenti un plaisir bien réel, en prenant des angles dans le tour de l'horizon d'une station aussi remarquable, sur laquelle avaient assurément plané les regards de Ptolemée, le patriarche de la géographie.

Il est encore bien extraordinaire d'avoir éprouvé que cette colonne n'était pas assez ferme à y pouvoir prendre des hauteurs dans un horizon artificiel de mercure, quoique recouvert de son toit de glaces, et quoiqu'il fût placé dans une cavité creusée exprès dans la surface du chapiteau, pour le bien abriter. Lorsque les deux bords du soleil étaient en contact, on s'apercevait d'un mouvement continuel et léger, provenant de l'oscillation du mercure. J'ai par conséquent dû avoir recours à un horizon de verre coloré, sur lequel j'ai pu faire l'observation suivante:—

Sur la colonne d'Alexandrie, le 3 avril, 1822.

Baromètre	29, 94	+0, 4
Thermomètre	63°, 4	—0, 5

Double hauteur méridienne du ⊙	126°	38′	25″
Erreur de collimation	+	51	30
Double hauteur corrigée	127	29	55
Hauteur apparente ⊙ bord inférieur	63	44	57,5
Demi-diamètre et parallaxe	+	16	04,7
Hauteur apparente du centre du ⊙	64	01	02,2
Réfraction vraie		—	27,5
Hauteur vraie du centre du ⊙	64	00	34,7
Sa distance vraie au zénith	25	59	25,3
Déclinaison du ⊙ réduite boréale	5	10	24,0
Latitude de la colonne	31	9	49

* *Aphthonius* d'Antioche était sophiste et rhéteur, qui a vécu dans le xi. siècle; il a laissé quelques ouvrages. Voyez *Suidas in Aphthonio.*

J'ai aussi observé à un cadran solaire la variation de l'aiguille aimantée au sommet et à la base de la colonne, et j'ai trouvé une assez grande différence due à quelque localité inconnue.

La variation était au sommet	13° 20′	à l'ouest
„ „ à la base	11 35	„
Différence .	1 45	

Voici les véritables dimensions de cette célèbre colonne, mesurée avec le dernier scrupule, à cause de la grande diversité qui régne sur ces mesures. (4)

HAUTEURS.

De la pointe jusqu'à l'astragal . .	10 pieds	4¾	pouces anglais	
De l'astragal à la base . . .	67 „	8	„	„
De la base au terrain	21 „	4	„	„
Hauteur totale de la colonne . .	99 „	4¾	„	„

DIAMETRES.

Circumférence supérieure . . .	24 pieds	2	pouces anglais	
„ au milieu . . .	27 „	1¾	„	„
„ inférieure . . .	27 „	7¼	„	„
Piédestal, carré	14 „	5½	„	„
Chapiteau, carré	11 „	9	„	„
Chapiteau la diagonale . . .	16 „	10½	„	„

Nous avons déchiffré en grande partie la dédicace grecque du préfet d'Egypte à Dioclétien (5), mais il n'est pas prouvé pour cela que Dioclétien avait quelque chose à faire à cette colonne, pas plus que la France n'y avait part, si (comme elle avait eu cette intention) elle l'avait dédiée avec solemnité à l'armée française et au directoire. Cette expédition extraordinaire a certainement produit de grandes merveilles en humanisant les habitans du pays par la fréquente communication avec les chrétiens.

Je termine cette lettre en vous envoyant ici tous les angles que j'ai pris sur une station si peu commune, au sommet de cette colonne si remarquable. Chaque angle est la moyenne de trois répétitions.

Du phare au rocher du diamant	1°	04′	35″
Du rocher du diamant à l'aiguille de Cléopatre . .	25	40	15
De l'aiguille de Cléopatre au pharillon . . .	2	12	10
Du pharillon à la nouvelle mosquée du Pacha . .	9	55	30
De la nouvelle mosquée au fort Crétin . . .	3	39	30
Du fort Crétin au Kiosk du canal	47	25	15
Du Kiosk du canal à la tour des Arabes . . .	160	32	45
De la tour des Arabes au Marabut occid[l] . . .	16	03	15
Du Marabout occid[l] au Kiosk du grenier . . .	27	29	20
Du Kiosk du grenier au rocher de Baseline . .	0	38	10
Du rocher Baseline au point Eunost . . .	11	18	15
Du point Eunost au harem du Pacha . . .	16	02	25

Du harem au moulin à vent sur la colline . . .	10	34	15
Du moulin à vent au fort Caffarelli	11	23	00
Du fort Caffarelli au Minaret mince	5	56	10
Du mince Minaret à la mosquée de St. Athanase . .	0	29	15
De la mosquée St. Athanase au vieux château . .	0	32	20
Du vieux château à la maison du gouverneur . .	1	11	10
De la maison du gouverneur au petit Minaret . .	0	57	10
Du petit Minaret au phare (fanal)	6	56	00

NOTES BY BARON DE ZACH.

(1) On trouvera dans le xvii. volume, page 489, du *Naval Chronicle*, 1807, un plan de l'ancienne ville d'*Alexandrie*, et de *Scandria*, la nouvelle ville actuelle, avec ses deux ports; la baïe d'*Aboukir* ou *Bequiere*, le *Delta* et les bouches du Nil, les vues de deux pharillons, les ruines de la bibliothèque d'Alexandrie, &c. dressé par le géographe anglais *John Luffman*.

En 1817 M. *Chrétien Falbe*, lieutenant de vaisseau de la marine royale danoise, a levé un fort bon plan des deux ports d'Alexandrie. Toutes les sondes, rochers, récifs, bancs de sable y sont marqués avec soin. M. *Falbe* a publié cette carte à Livourne en 1818, et y ajouta des remarques pour en faciliter l'usage aux navigateurs. Ces remarques ont été imprimées sur une demi-feuille en français à Livourne en 1818, et en anglais à Copenhague en 1819. M. *Falbe* place le phare, ou le grand-fanal, en 31° 13′ 5″ latitude boréale, et en 27° 35′ 30″ à l'est du méridien de Paris. La variation de l'aiguille aimantée 13° à l'ouest. Cette détermination est celle que les membres de l'Institut d'Egypte y ont faite en 1798. Selon ces mêmes savans, la latitude de la colonne de Pompée est = 31° 11′ 14″; la longitude = 27° 36′ 15″. La variation 13° 6′ à l'ouest.* D'après ces données, il y aurait une différence de 1′ 25″ sur la latitude de cette colonne, dont la distance à la méridienne du phare est 1038^{m}, 5 mètres à l'est, et 3473^{m}, 1 mètres au sud de sa perpendiculaire. La base que les français y avaient mesurée était de 653 mètres, et les angles ont été pris avec un cercle-répétiteur de Borda.

(2) Effectivement aucun auteur ancien n'a fait mention de cette colonne sous le nom de *Pompée*. On croit généralement que la ville d'Alexandrie avait été fondée par Alexandre le grand, 330 ans avant notre ère, mais il est question d'une ville Alexandrie en Egypte, long-tems avant ce conquérant; les prophètes dans l'ancien testament en parlent; *Jérémie* au chap. 46, v. 25; *Ezechiel*, ch. 30, v. 14 et 16; *Nahum*, ch. 3, v. 8. Au vrai, il n'y a que les traductions latines qui nomment cette ville *Alexandrie*, car dans le texte hébreu, il y a toute autre chose, elle y est appelée *No-Ammon*, qu'on a travesti en *Alexandrie*. Selon Diodore de Sicile cette ville avait plus de 7 lieues de long, et 12 milles de circonférence, avec une population de trois-cent mille habitans. Les anciens auteurs ne tarissent pas dans leurs descriptions sur la magnificence de ses édifices, ampithéâtres, temples, obélisques, colonnes, etc. De toutes ces merveilles il n'est resté que deux obélisques, dont l'un sur pied, l'autre renversé, connus sous le nom d'*aiguilles de Cléopatre*, et la belle colonne

* Voyez mes éphémérides géograph. vol. iv. p. 62.

de granit à laquelle on a donné si mal-à-propos les noms de *Pompée*, de *Severus*, d'*Adrien*, de *Dioclétien*, sans autorité quelconque. Le fameux *phare* bâti par Ptolemée Philadelphe 230 avant notre ère, a disparu depuis long-tems; on l'a remplacé par une tour nommée le *grand-Pharillon* * qui sert de fanal. Je ne sais où *Jean-Baptiste Porta* apprit que le Roi *Ptolemée* avait fait placer dans ce phare un miroir, ou plutôt une lunette, qui lui faisait appercevoir et distinguer les vaisseaux à une distance de six-cents milles.† Aucun auteur ancien n'en a jamais parlé.

J'ai fait remarquer il y a long-tems ‡ que les anciens connaissaient bien le microscope, mais non pas le télescope ou la lunette d'approche. Sénèque dans le premier livre de ses questions naturelles dit fort-clairement: "Poma per vitrum adspicientibus multo *majora* sunt. Columnarum intervalla porticus *longiores* jungunt. . . . Literae quamvis minutae et obscurae, per vitream pilam aqua plenam *majores clarioresque* cernuntur. Poma *formosiora* quam sint videntur si innatant vitro. Sidera *ampliora* per nubem adspicienti videntur. . . . Quidquid videtur per humorem longe *amplius* vero est. Quid mirum, *majorem* reddi imaginem solis, quae in nube humida visitur, cum de causis duabus hoc accidat? quia in nube est aliquid vitro simile, quod potest perlucere, est aliquid et aquae, etc. . . ." Mais à toutes ces épithètes, *majora*, *longiora*, *ampliora*, *clariora*, *formosiora*, il manque la seule qui caractériserait la lunette d'approche, c'est le *propinquiora;* aucun auteur ancien ne l'a jamais employée.

Le fameux moine anglais *Roger Bacon* y était bien plus près, quatre siècles avant la découverte des lunettes, lorsque d'un esprit prophétique il avait dit dans son ouvrage, *de mirabili potestate artis et naturae*,§ "Possunt enim figurari perspicua, ut *longissime* posita appareant *propinquissima* et e contrario; ita quod incredibili distantia legeremus litteras minutissimas et videremus res quantumque parvas." Voilà une parfaite description du *télescope*, lequel cependant n'existait que dans l'imagination de *Bacon;* mais lorsqu'il ajoute, "Sic enim existimant quod Julius Caesar per littus maris in Galliis deprehendisset per ingentia specula dispositionem et situm castrorum et civitatum Britanniae," on est aussi tenté de croire qu'un pareil conte n'existait que dans le cerveau trop fertile de ce moine.

Il est vrai que *Henri Salmuth* dans ses notes sur l'ouvrage de *Pancirole*,‖ fait remonter la découverte des lunettes d'approche à la plus haute antiquité, en s'appuyant sur deux passages dans Plaute. Dans sa comédie *Cistellaria*, il est dit dans le 1er acte, 1re scène, 93, "Dum redeo domum, conspicilio consequutus est clanculum me usque ad fores." Dans le fragment de la comédie du Médecin, on trouve cette phrase: "In conspicilio adservabam, pallium observabam." Mais *Nonius* et autres commentateurs entendent par *conspicilium* un lieu d'où l'on pouvait voir sans être vu, comme dans nos volets à claire voïe, que nous appe-

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* Le *petit Pharillon* est de l'autre côté de l'entrée du nouveau port, qui n'est destiné que pour les vaisseaux chrétiens, le vieux port *(l'Eunostus)* est réservé aux navires des musulmans.

† *Diximus de Ptolomaei speculo, sive specillo potius, quo per sexcenta millia pervenientes naves conspiciebat.* Jo. B. Porta, *Mag. Natur.* lib. 17, cap 11.

‡ Corresp. Astr Allem. vol. viii. page 42.

§ Ce traité a été traduit en français par J. *Girard* de Tournus. Paris 1526, in-8°. Il a été réimprimé à Lyon en 1557, in-8°, sous le titre, *L'admirable pouvair et puissance de l'art de nature, etc.*

‖ *Rerum memorabilium jam olim deperditarum et recens inventarum, etc. Ambergae* 1599—1602, 2 vol. in-8°. *Salmuth* l'a traduit de l'italien. Il y a aussi une traduction française par P. *de la Noue.* Lyon 1617, 2 vol. in-12. *Pancirole* était de *Reggio*, patrie d'Arioste; mais il composa ce traité à Turin, où il fut appelé de Padoue par *Philibert Emmanuel* Duc de Savoie. Mais l'air de Turin lui ayant fait perdre un oeil, et le mettant en danger de perdre l'autre, il retourna à Padoue, où il est mort en 1599. Pour cette raison et autres, le climat de Turin n'a jamais été favorable aux astronomes.

lons *jalousies* ou *persiennes*. Voyez sur la découverte des lunettes par les anciens, ce que nous avons rapporté dans notre *Correspondance astronomique allemande*, vol. viii. p. 42; xxiii. p. 600; xxiv. p. 82; xxv. p. 392.

(3) Les français montèrent sur cette colonne en 1798, au moyen d'un cerf-volant, et y plantèrent le *bonnet de liberté*. Elle est d'un beau granit rouge, toute d'une pièce depuis le socle jusqu'au commencement du chapiteau, mais dont le travail assez médiocre fait soupçonner que l'architecture à cette époque n'était pas parvenue encore à sa plus haute perfection. Les critiques trouvent aussi le piédestal trop petit et trop bas, et pas dans les justes proportions. Cette colonne d'ordre corinthien est très-bien conservée, excepté vers le sud, et le nord-est, où elle est un peu rongée, apparemment par les vents violents qui soufflent la plus grande partie de l'année de ce rumb. Elle penche aussi un peu vers le sud-ouest. Les français ont fait des réparations aux fondemens, qui avaient été détruites en partie par la rapacité brutale d'un arabe, qui, s'imaginant qu'il y avait des trésors cachés, voulait la faire sauter en l'air, mais heureusement il n'a pas réussi. Le capitaine *Smyth* a eu la bonté de nous envoyer un fort-joli dessin en gouache de cette superbe colonne, la ville d'Alexandrie, et le paysage à-l'entour en perspective, avec les enfléchures fixées à ce majestueux pilier.

(4) Il y a assurément une très-grande diversité dans les mesures que les différens voyageurs assignent à cette colonne, tels que *Norden*, *Pococke*, *Tott*, *Savary*, *Volney*, *etc.*

Il n'y a que ceux qui y sont montés, qui ont pu prendre au cordeau des mesures fort-exactes; de ce nombre sont le cap^e^ *Smyth*, et les ingénieurs français de l'Institut d'Egypte. Ces derniers ont donnée les dimensions suivantes:—

Hauteur du piédestal	. . .	10 pieds	0 pouces	de	Paris.
„ du socle	. . . .	5 „	6 „		„
„ du fût	. . . .	63 „	1 „		„
„ du chapiteau	. . .	9 „	10 „		„
Hauteur totale	.	88 pieds	5 pouces.		

Ce qui fait 94 pieds 2 pouces de Londres; cette mesure diffère de 5 pieds de celle du capitaine *Smyth*. Cette différence peut provenir du piédestal et du terrain plus ou moins encombré ou déblayé depuis 24 ans.

(5) C'est bien dommage que le cap^e^ *Smyth* ne nous ait point envoyé cette inscription pour pouvoir la comparer à celle rapportée dans le journal de la dernière campagne des anglais en Egypte, publié en 1803 à Londres par *Thomas Walsh* capitaine du 93^me^ régiment d'infanterie, et aide-de-camp du général *Coote.** On y trouve entre la page 224 et 225 deux planches gravées, sur l'une desquelles est représentée la colonne de Pompée, et l'aiguille de Cléopatre sur pied. Sur l'autre est gravée l'inscription grecque, d'abord défectueuse, comme on l'a pu déchiffrer, ensuite suppliée par conjecture. Dans la note anglaise gravée sur cette même planche, il est dit, que cette inscription se voit très-distinctement sur la face occidentale du piédestal de cette colonne, quoique cela eût été contredit par quelques voyageurs. Cette inscription cependant était dans un tel état qu'il n'y avait qu'une ardeur excessive, et la patience la plus infatigable, qui a pu venir à bout à la déchiffrer. C'est ce qui à la fin, après des travaux bien pénibles, et des peines infinies, avait pour-

* Journal of the late Campaign in Egypt, including descriptions of that Country and of Gibraltar, Minorca, Malta, Marmorice, and Macri, with an Appendix, containing official papers and documents, by Thomas Walsh, Captain in his Majesty's ninety-third regiment of foot, Aide-de-camp to Major-General Sir Eyre Coote, illustrated by numerous engravings of Antiquities, Views, Costumes, Plans, Positions, etc. London, 1803, in-4°, avec 49 planches, supérieurement gravées, et en partie coloriées. On a probablement traduit cet ouvrage en français et en allemand.

tant réussi au capitaine *Dundas* de l'état-major de l'armée britannique en Egypte et au lieutenant *Desade* du régiment allemand de la Reine. Ces officiers ayant été souvent visiter cette colonne dans ces momens fort-courts que le soleil donnait obliquement sur cette face du piédestal, de manière à marquer les lettres par leurs ombres, étaient à la fin parvenus à les démêler l'une après l'autre. Ils ont mis six semaines à remplir cette tâche, ce qu'aucun des savans et érudits français n'avait pas même tenté de faire, pendant le long séjour qu'ils ont fait en ce pays. Ces officiers en déchiffrant cette inscription, croyaient avoir découvert *par qui et pour qui* cette colonne avait été érigée; mais les doutes du capitaine *Smyth* ne sont pas sans fondemens; sa remarque, si elle n'est pas prouvée irrévocablement, est au moins très-juste, et autorise à des soupçons, par conséquent il faudrait encore quelque autre *criterium* pour décider cette question douteuse, laquelle apparemment le restera toujours.

Voici d'abord l'inscription avec ses lacunes, telle que ces officiers l'ont débrouillée.

ΤΟ . . . . ωΤΑΤΟΝ ΑΥΤΟΚΡΑΤΟΡΑ
ΤΟΝΠΟΛΙΟΥΧΟΝ ΑΛΕΞΑΝΔΡΕΙΑC
ΔΙΟΚ . Η . ΙΑΝΟΝΤΟΝ . . . . ΤΟΝ
ΠΟ . . . . ΕΠΑΡΧΟC ΑΙΓΥΠΤΟΥ.

Inscription avec les lacunes remplies par M. *Hayter* à Naples, célèbre par ses travaux sur le déchiffrement des manuscrits du *Herculanum.*

ΤΟΝ ΤΙΜΙωΤΑΤΟΝ ΑΥΤΟΚΡΑΤΟΡΑ
ΤΟΝ ΠΟΛΙΟΥΧΟΝ ΑΓΕΞΑΝΔΡΕΙΑC
ΔΙΟΚΛΗΤΙΑΝΟΝ ΤΟΝ CΕΒΑCΤΟΝ
ΠΟΝΤΙΟC ΕΠΑΡΧΟC ΑΙΓΥΠΤΟΥ.
ΠΡΟCΚΥΝΕΙ.

TRADUCTION.

A Dioclétien Auguste
Très-adorable Empereur
La divinité tutélaire d'Alexandrie
Pontius, préfet d'Egypte,
consacre ceci.

Here follows the second letter alluded to:—

A bord du vaisseau de S. M. B. l'Aventure dans
la baie de Naples, le 20 *avril* 1823.

J'ai l'honneur de vous faire savoir que je suis arrivé sur la côte septentrionale de la méditerranée, où je suis occupé à-présent à vérifier plusieurs de mes points que j'avais déterminés, il y a quelques années, avec mes chronomètres, pour les réduire à une base commune, et les rattacher tous au méridien de Palerme.

A mon arrivée ici, mon excellent ami le colonel Visconti me prêta les trois derniers volumes de vôtre Correspondance que je n'avais pas encore vus, et j'y ai trouvé, avec bien de plaisir, les observations et les aventures de M. Rüppell en Egypte. Je ne m'étais donc pas trompé dans mon attente lorsque j'eus le plaisir de faire sa connaissance chez-vous, qu'il rendrait de grands services à la science.

J'ai vu dans les notes que vous avez ajoutées à sa lettre du Grand-Caire dans le 1^er^ cahier du viii^e^ volume, que vous croyez qu'il reste encore quelque doute sur la longitude d'Alexandrie (1); je ne la crois pas tant incertaine; vous n'avez qu'à voir page 422 du vii^e^ volume, où vous y trouverez ma détermination bien vérifiée à mon retour à Bomba, d'où je l'ai portée à Malte. Jamais les chronomètres ne se sont mieux comportés qu'en cette campagne, comme vous pourrez vous en convaincre en examinant toutes mes opérations que je vous ai envoyées en détail, et dont vous n'avez publié que les résultats, page 426 de ce même volume. J'avais alors le très-grand et très-important avantage d'avoir pu faire voile d'un lieu donné avec six chronomètres, et d'y revenir en fort peu de tems, ce qui m'a procuré un excellent contrôle. J'étais très-satisfait de cette détermination, et je la croirai toujours très-bonne jusqu'à ce que quelque autre ne l'ait répétée dans des circonstances aussi favourables que les miennes; mais la plupart des voyageurs, et même les savans français de l'Institut d'Egypte, ne sont pas toujours assez exacts à désigner les places où ils ont fait leurs observations, ce qui donne souvent lieu à des différences, qui n'existent pas dans la réalité.

Le grand phare d'Alexandrie est toujours au même point, les turcs en tout tems ont été jaloux de le conserver, malgré toutes les invasions des chrétiens de tous pays, mais on ne sait pas dans quelle maison Niebuhr a pris en 1761 ses angles. L'éclipse d'Antares le 27 août 1800, et les trois éclipses du premier satellite de Jupiter en 1798 observées par M. Nouet, ainsi que les 480 distances lunaires observées par M. Quénot, mériteraient, à la vérité, quelque attention, mais je ne comprends rien à ce merveilleux accord obtenu par un seul chronomètre! Le hasard peut bien produire des coïncidences, mais celles dont vous faites mention dans votre note doivent paraître bien extraordinaires à tous ceux qui ont beaucoup travaillé avec les chronométres, et qui ont une grande pratique avec ces instrumens si délicats.

Pour pouvoir vérifier un jour les points principaux que j'ai déterminés à Alexandrie, je vous donnerai ici les mesures géodésiques de ceux dont vous avez déjà publié les latitudes qui avaient été observées par des hauteurs méridiennes du soleil; les petites différences qu'on y trouve sont apparemment dues à quelque aberration de l'aiguille aimantée, avec laquelle on a déterminé

3 B

l'azimuth de la base. La latitude observée au sommet de la colonne ne peut être regardée comme une bonne observation, soit à cause de la position gênante dans laquelle il fallait s'y tenir, soit à cause de ce qu'on était obligé de se servir d'un horizon artificiel de verre, au lieu de celui de mercure. Mon point de départ était la pointe Eunost dans le port occidental, dont j'avais fixé la latitude à 31° 11′ 27,7″, et la longitude 29° 51′ 57,6″, à l'est de Greenwich. De-là, les opérations géodésiques ont donné—

Noms des lieux.	Directions.	Distances en Yards.	Latitudes Bor.	Longitudes à l'Est de Greenwich.
Pointe Eunoste	O.	o	31° 11′ 27,7″	29° 51′ 57,6″
Phare, le grand Fanal	N. 49° E.	3425	31 12 34,6	29 53 27,5
Colonne d'Alexandrie	S. 66° 45′ E.	3792	31 10 45,0	29 53 59,6
Ile Marabut	S. 55° O.	9176	31 08 51,2	29 47 36,4
Porte de Rosette	N. 82° E.	5393	31 11 50,0	29 55 03,0
Bains de Cléopatre	S. 1° 30′ E.	3221	31 09 52,0	29 52 00,5

Vous regrettez que je n'aie pas mieux examiné l'inscription sur la colonne; je ne l'ai point fait parce que je savais que le Capitaine Dundas et le Lieutenant Desade l'avaient fait avec beaucoup de soin. Dans le fond il est seulement curieux de voir, que parmi tant de savans et d'érudits, qui ont parcouru toute l'Egypte, aucun n'avait déchiffré cette inscription, et qu'on a laissé faire ce docte travail à deux soldats anglais! Mais, comme je l'ai déjà remarqué, cette inscription ou dédicace semble plutôt un monument de vanité et d'adulation de Pontius pour un Empereur, qui était un grand admirateur de ces architectures gigantesques, qu'une autorité pour nous apprendre qui était celui qui avait fait ériger cette colonne colossale. Elle avait été probablement élevée par Ptolemée Evergete, peut être en mémoire de la restitution de 2500 peintures et statues que Hérodote nous dit avaient été emportées par le victorieux Cambyses. C'est peut être ici (pour revenir à mon paradoxe favori) que ce grand monarque a fait placer les armilles, ou les cercles de bronze, avec lesquels Eratosthène fit sa célèbre observation de l'obliquité de l'écliptique 23° 51′ 20″.

Je vous ai dejà dit pourquoi on avait donné à ce monument le nom de colonne de Severus. L'érudit, et par-fois le visionnaire Bryant, dit qu'elle avait servi de signal, ou de reconnaissance pour les marins. L'oracle de Ham fut appelé Omphi, on en fit P'Omphi et P'Ompi, et de-là, colonne de Pompée! Plusieurs autres auteurs ont attribué l'élévation de cette colonne à Alexandre le Grand, à César, à Adrien, mais ils n'ont pas daigné nous dire sur quoi ils fondaient leurs conjectures.

En 1767 on avait lu à la société royale de Londres une lettre de M. Wortley Montague, gentilhomme anglais, qui voyageait alors dans l'orient, dans laquelle est rapporté le fait suivant, bien extraordinaire. (2)

M. Montague, ayant fait déblayer la base de cette colonne, dit qu'il a pu entrer dans l'intérieur du piédestal, et qu'avec son couteau de chasse il avait déterré de dessous la base une médaille de Vespasien. Ayant examiné ce piédestal sur le lieu, la lettre identique de M. Montague à la main, je ne puis m'empêcher de dire, quelque rude que puisse paraître l'expression, que tout ce récit est une histoire absolument fausse. Apparemment M. Montague, qui était connu pour un homme aussi singulier (eccentric) qu'ingénieux, n'a voulu que s'amuser et mystifier (hoax)* par-là les antiquaires.

Quant à votre remarque, note 4, vol. vii^{e}, page 62, je vous dirai que c'était précisément à cause de ces grandes différences qui existent dans les mesures de cette colonne, la plus magnifique de tout l'univers, données par Maillet, Norden, Greaves, Pococke, De Tott, Savary, Volney, et plusieurs autres, que j'ai pris tant de peine pour en prendre une plus exacte, en y montant. (3)

Les ingénieurs de l'expédition française en Egypte avaient employé le même moyen, et il est vraiment étonnant de voir qu'ils ont pu se tromper de cinq pieds, faute assez grossière. J'ai fait mes mesures avec beaucoup de soin et avec une grande précision, les ayant prises au cordeau, et avec la règle. Il est également impossible qu'un changement dans le terrein, comme vous l'avez supposé, ait pu avoir lieu ; la colonne est placée sur une colline hors des murs de l'ancienne ville ; on voit évidemment par les localités qu'aucun changement n'y a pu arriver, excepté que les français en 1801 avaient fait faire quelques réparations au fondement qui avait été endommagé par la rapacité d'un chef arabe, qui, dans l'espoir d'y trouver quelque trésor caché, a voulu faire sauter la colonne. Avec une base de 80 pieds, et avec deux angles pris avec le sextant, j'ai trouvé sa hauteur de 101 pieds. Avec mon grand télescope micrométrique j'ai trouvé—

Le chapiteau	9 pieds	10 pouces.
Le fût	67 ——	$6\frac{3}{4}$
La base	5 ——	$10\frac{1}{2}$
Le piédestal	14 ——	11
Hauteur totale . . .	98 ——	$2\frac{1}{4}$

La mesure au cordeau et à la règle mérite naturellement la préférence sur les deux autres, qui n'ont été prises que par amusement.

Je vous ai écrit une lettre de Malte, dans laquelle je vous ai envoyé toutes les positions que j'avais déterminées dans le grand Syrtis ; j'avais donné cette lettre à un voyageur anglais, qui devait vous la remettre lui même à Gênes, ou, en cas de quelque empêchement, à quelque bureau de poste en Italie.† Je vous enverrai bientôt mes autres positions dans le petit Syrtis, &c. . . . . . .

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* *Hoax*, terme néologique dans la langue anglaise qu'on ne trouve pas dans le dictionnaire de *Johnson*, et que nous croyons pouvoir traduire par *mystifier*, qui veut dire abuser de la crédulité pour rendre ridicule.

† Jusqu'au moment présent que nous corrigeons les épreuves de cette feuille (21 mai 1823), cette lettre ne nous est pas encore parvenue.

NOTES BY BARON DE ZACH.

(1) Lorsque nous avons dit dans notre seconde note, p. 49 du viii^e volume de cette *Correspondance*, que la longitude d'Alexandrie était encore sujette à quelque incertitude, ce n'était pas pour dire que celle donnée par le Capitaine *Smyth* n'était pas exacte, ce que nous n'avons jamais dit, car nous savions fort bien que de toutes celles qu'on avait entrepris à déterminer, celle du Capitaine *Smyth* était la seule qui réunissait le plus haut degré de probabilité de s'être approchée de la vérité. Nous avons seulement dit, page 52, que sa détermination n'avait point de confirmation, ce qui est encore vrai dans ce moment, car tout ce qu'on a fait jusqu'à-présent sur cette longitude, ne peut servir à la confirmer. Celles qu'on a produites, sont si disparates, leurs différences entre elles sont si grandes, qu'on n'en peut pas même prendre un milieu arithmétique quelconque, comme on peut s'en convaincre, en jetant un coup-d'œil sur ce tableau, dans lequel nous les rassemblerons toutes:

	Longitude d'Alexandrie en tems à l'est de Paris.
M. *Quénot* avec chronomètre n° 19	1h 50′ 16″
M. *Nouet* avec chronomètre n° 34	1 50 51
M. *Nouet* par des éclipses des satellites de Jupiter .	1 50 12
	1 49 58
	1 50 58
	1 49 48
	1 51 12
M. *Nouet* par l'éclipse d'Antares	1 50 33
M. *Quénot* par 480 distances lunaires	1 51 40
M. *Niebuhr* par des distances lunaires en 1761 . .	1 51 21,2
	1 51 16,5
M. le Capitaine *Smyth* par 4 chronomètres . . .	1 50 7

La différence des stations dans lesquelles on a fait ces observations, ne suffisent pas pour expliquer ces énormes différences; toutes ces observations ont été faites dans le quartier habité par les chrétiens près du port, et il n'y a certainement pas deux points dont la différence des longitudes peut aller à un demi degré, comme la donnent ces observations. Nous insistons, au contraire, à faire remarquer combien on doit être sur ses gardes, et combien il est délicat d'établir une bonne longitude. Ici toutes les méthodes étaient en défaut; éclipses d'étoile, éclipses des satellites, distances lunaires, chronomètres, tous s'écartaient considérablement de la vérité.

Il est même remarquable de voir que la détermination laquelle, d'après sa nature, aurait dû être la plus exacte, c'est-à-dire, l'eclipse de l'étoile par la lune, soit précisément celle qui s'écarte de plus de 6 minutes de la vraie longitude. Quatre-cent et quatre-vingt distances lunaires, prises avec un cercle de réflection répétiteur de *Borda*, ont donné une longitude qui s'éloigne de 23 minutes de la vraie. Nous avions donc raison de dire que la détermination du Capitaine *Smyth* n'a pas encore été confirmée par aucune observation astronomique; cette considération ne la met nullement en doute, car toute exacte qu'elle est assurément, il reste pourtant vrai qu'elle ne repose sur aucun de ces signaux célestes par lesquels on détermine ordinairement les longitudes géographiques, auxquels on accorde le plus de confiance, et par lesquels ont été fixées les longitudes de tous nos observatoires en Europe.

Qu'on se rappèle toujours qu'on était plus d'un siècle dans une incertitude d'une minute et quinze

secondes sur la différence des longitudes des deux plus célèbres observatoires de l'Europe, de *Greenwich* et de *Paris.* Qu'on se rappèle qu'il y a encore des observatoires tres-renommés dont les longitudes sont dans la même incertitude. On n'a qu'à regarder ce que nous avons dit et fait voir dans le 1er volume, pages 56-58 de cette *Correspondance,* et on y trouvera une différence de 6 minutes et demie sur la longitude d'un des plus célèbres observatoires de l'Allemagne.

(2) La lettre de M. *Edouard Wortley Montague,* dont il est question ici, se trouve dans le 57e tome des transactions philosophiques de la société royale de Londres pour l'année 1767. M. *Montague* y dit, que dès qu'il vit cette colonne, il s'était aussitôt persuadé qu'elle n'avait point été élevée du tems de *Pompée. Strabon* et autres auteurs anciens en auraient parlé; il se proposa par conséquent de l'examiner avec grande attention.

Il s'aperçut d'abord que le piédestal était construit avec peu de solidité, qu'il était composé de grandes et de petites pierres de différentes qualités, incapables de soutenir un aussi grand poids; il en conclut que ce piédestal n'avait pas été construit en même tems que la colonne.

Il essaya d'en détacher une pierre, il y réussit sans difficulté, et il vit que ce piédestal était intérieurement creux.

Il y fit pratiquer une grande ouverture à pouvoir y entrer, mais quelle fut sa surprise, en voyant que cette masse énorme était posée sur un obélisque renversé, comme sur un pivot! Curieux de connaître la longueur de cet obélisque, il fit creuser, et il découvrit à son grand étonnement que ce n'était qu'on tronçon de quatre pieds et un pouce de hauteur posé sur un massif de maçonnerie. La pierre en était extrêmement dure, c'était une espèce de *conglomérat* de pierres vitrifiées. Ce morceau d'obélisque était couvert d'hiéroglyphes, ce qui prouve, selon M. *Montague,* que cette colonne n'a pas été érigée dans les tems que ces caractères étaient sacrés, et que ce monument n'était pas aussi antique qu'on le croyait.

M. *Montague* a longtems cherché s'il ne pouvait découvrir quelque chose qui pût le conduire à quelque conjecture raisonnable. Il a bien remarqué une inscription, mais il n'a pu la déchiffrer, elle avait été effacée par force, car il a vu très-distinctement les traces de l'instrument dont on s'était servi pour raturer les caractères grecs qui y étaient gravés, et dont il n'a pu reconnaître un seul mot. Ayant observé que le ciment qui liait le fût à la base s'était détaché d'un côté, curieux de voir de quelle manière cette jonction avait été faite, et si l'on y avait employé du plomb, il en détacha un morceau avec son couteau de chasse, il aperçut une tache noire à-peu-près un pied de la circonférence audessous de la colonne, il en retira une médaille de *Vespasien* très-bien conservée avec la légende:—

ΑΥΤ . ΚΑΙΣ . ΣΕΒΑ . ΟΥΕΣΠ.

Sur le revers on voyait une victoire en marche avec quelques épis dans la main droite, et une palme dans la gauche. Cette médaille fut montrée a la société royale. Les hiéroglyphes sur le tronçon de l'obélisque renversé sont une preuve, dit M. *Montague,* que ce monument n'a pas été élevé avant le tems de *Pompée,* et qu'il est évident qu'il n'avait pas été connu avant *Vespasien.* Cette médaille n'a pu non plus s'introduire dans ce fondement par accident, puisqu'elle avait été retirée par force de dessous du fût de la colonne. M. *Montague* croit par conséquent que ce monument avait été élevé en honneur de *Vespasien,* etc.

Voici bien des circonstances rapportées dans la lettre de M. *Montague* avec plus de détails que nous ne l'avons fait ici par extrait, cependant le Capitaine *Smyth,* comme on le voit dans sa lettre, détruit et annulle tout ce récit. C'est donc toujours ainsi qu'on *fait* l'histoire, et qu'on se moque des pauvres savans! Nos connaissances historiques ne seraient-elles donc que de mauvaises plaisanteries?

(3) Cette mesure faite avec la lunette micromètrique ne diffère que d'un pied deux pouces et demi de celle que le Capitaine *Smyth* a donnée page 55 du vii^{e} volume de cette *Correspondance*. Cette dernière est naturellement la plus exacte, puisqu'elle a été faite au cordeau, la Capitaine *Smyth* étant monté sur la colonne. Le 2 février 1803 le Capitaine *Shortland*, du vaisseau de S. M. B. le *Pandour*, de 54 canons, y etait aussi monté au moyen d'un cerf-volant, avec lequel on avait porté des cordes au sommet de la colonne. Le Capitaine *Shortland* y a laissé un écrit renfermé dans une bouteille de verre, dans lequel il a fait mention de son ascension, et des événemens du tems. Il y parle de la conquête et de l'évacuation de l'Egypte par les armées françaises et anglaises, etc. M. *Smyth* ne dit rien de cette bouteille, s'il l'a trouvée sur cette colonne, ou s'il en a déposé une autre. On trouvera des détails sur l'ascension du Capitaine *Shortland* dans le xxvii^{e} volume du *Naval Chronicle* pour 1812, page 111, mais il ne paraît pas que ce capitaine y ait fait des observations ou des mesures.

No. III.

THE RESIDENCE OF THE FRENCH ROYAL FAMILY AT HARTWELL.

Now, my co-mates, and brothers in exile,
Hath not old custom made this life more sweet
Than that of painted pomp? Are not these woods
More free from peril than the envious Court?
* * *
Sweet are the uses of adversity;
Which, like the toad, ugly and venomous,
Wears yet a precious jewel in his head;
And this our life, exempt from public haunt,
Finds tongues in trees, books in the running brooks,
Sermons in stones, and good in every thing.

As You Like It.

It is pretty evident that his Most Christian Majesty, Louis the Eighteenth, King of France and Navarre, must have been quite as well acquainted with adversity as Shakespeare's Duke Senior was; and, though our present business with him relates mainly to his residence at Hartwell, a few rambling remarks may be dropped in proof of the alternating and protracted vicissitude which he underwent. And first, a bird's-eye view of his tortuous career—

Louis Stanislaus Xavier Capet was born, amidst the gratulations of a splendid court, in the magnificent palace at Versailles, on the 17th of November, 1755: immediately became Comte de Provence, and at the immature age of sixteen was married—with universal rejoicings—to a damsel two years older than himself, namely, Maria Josepha Louisa, a princess of the House of Savoy:

he escaped with Comte d'Avaray, a Colonel of the Royal Guards, from the tumultuous convulsions of Paris in 1791: said to have been refused permission to land in England,* and compelled to wander about from place to place: succeeded as nominal King on the death of his ill-starred nephew in 1795: expelled from the Venetian territories, and wounded by an assassin's shot near Ulm, in 1796: sought and obtained refuge in Russia, in 1798; but ordered to quit the Muscovite dominions, by the frantic Emperor Paul, in 1801: resided some time at Mittau, in Courland; but, public affairs rendering his personal safety precarious, he resolved to try England again, when (see *post*—the disembarcation) he landed at Yarmouth in October, 1807, and shortly afterwards took up his residence in Hartwell House. A turn in fortune's wheel restored him to his throne in 1814, with every pomp and circumstance: he was then obliged to retreat to Lille on Napoleon's approach in March, 1815, but re-entered Paris in the following July; where he died, after much bodily suffering, on the 16th of November, 1824.

From this rapid glance over the life and adventures of Louis the Eighteenth, it will be acknowledged to have been a career in which adversity could teach her best lessons. Nor was the hero himself a deficient object for the trial; he being of an amiable disposition, and possessed of considerable powers of conversation, for which he was adapted by a share of wit, taste, common sense, acquired information, and, indeed, most of the qualities which, in private life, constitute an accomplished gentleman. He was, we may say, too well acquainted with *cuisinerie* for a præses in great affairs, and was rather too impatient of contradiction; nor do his attachments, except to his wife and the faithful d'Avaray, appear to have been sufficiently strong; the "out of sight out of mind" failing, having been deemed an unfortunate part of his otherwise benevolent character. Perhaps, as Goldsmith asserted of Garrick—

He threw off his friends, as a huntsman his pack,
For he knew when he pleas'd he could whistle them back.

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* This assertion is made from very vague reports, as in the Morning Chronicle, the Evening Star, and others; but, being unable to trace the why or the wherefore of so strong and unusual a measure, I sought the aid of my friend Sir Henry Ellis, of the British Museum, who replied—

"I have had every possible search made in regard to your inquiry when, how, and by whom Louis XVIII. when Monsieur, was refused permission to land in England. But in all the biographies and histories which could be referred to no trace of such refusal is to be discovered. Monsieur first sought his asylum in Austria, went thence to Naples, and afterwards to Russia.

"It is not impossible, from the condition of things at that time, that he might have wished to seek safety in England, and there might have been some parley, but, if I remember right, the necessity for his flight to Austria was sudden, and he was at the moment in a part of France whence he could not have reached the coast opposite to us very easily.

"In Beauchamp's Life of Louis XVIII. p. 156, it is said—'The Regent of France established himself at Verona in the States of Venice, where he thought he had found a secure asylum. It was there that he solicited of Spain and England for so long a time, with a constant but useless warmth, his passage to la Vendée, the chief focus of royalism and attachment to the Bourbons.'

"P. 141, 'Catherine II. was the only crowned head that recognized the regency of Monsieur, 1792.'

"Does this bear upon your inquiry, do you think? Upon this, or upon any subject, I am happy to aid you. Write again if I can serve you."

Louis, even in boyhood, evinced various good points of character; and was very early distinguished by a certain show of literary talent, on which he always valued himself. In the *Mémoires de M. Le Prince de Montbarey*, will be found an anecdote in point, respecting some deputies who came to Versailles to present an address of congratulation to Louis XV. The leader of these provincial gentlemen having performed his duty, proceeded to compliment the young princes, then almost in their childhood, the sons of the Dauphin. In bestowing on these boys, as a matter of course, every talent and every virtue, he eulogized the little Duc de Berri, afterwards Louis XVI. for his skill and ability; when the child ingenuously interrupted him with—"*Ce n'est pas moi qui ai de l'esprit; c'est mon frère de Provence.*"

In a spirit of moderate reform, Louis had at first favoured the Revolution, and generally voted with the *coté gauche;* but the wild and visionary frenzy which followed seems to have scared him. Neither vindictive nor ambitious, he delighted in peace and tranquillity, yielding to often painful circumstances with a dignified submission. Hence, though he played his part in the public arena with no mean ability, he was hardly energetic enough for the arduous situations in which he was occasionally placed. This was especially seen after his restoration, when all the ex-functionaries were needlessly foaming at the mouth against him, while his ultra-supporters were foolishly discontented because he could not replace them in the *status ante bellum.* Yet he did not want for firmness when screwed to the "sticking place." Though, it would seem, not entirely innocent of the Pilnitz confederacy, there could have been no criminal complicity, for the unfortunate prince refused to sign the treaty, or in any way agree to the partition of his country—a patriotic feeling, for which he incurred considerable hatred among the most ultra of the *emigrés.* When Napoleon had made himself master of the French Government, he made a proposition to Louis, that the latter should sell, for a large consideration, his claim to the throne: this overture was most indignantly spurned, and Francis the First had furnished a formula for the reply—"We have lost," said the exile, "we have lost every thing but our honour." And when he heard, by the same post, of the murder of the Duc d'Enghien and that the Spanish Order of the Golden Fleece had been conferred on Buonaparte, he forthwith returned his own decoration of the order to Charles IV. with the following missive:—

Sire, and dear Cousin.—It is with regret that I return you the insignia of the Order of the Golden Fleece, which his Majesty your father, of glorious memory, confided to me: there can exist nothing in common between me and the great criminal whom audacity and fortune have placed upon my throne, which he has had the barbarity to stain with the pure blood of a Bourbon, the Duc d'Enghien.

Religion teaches me to pardon an assassin; but the tyrant of my subjects ought always to be my enemy.

Providence, from inscrutable motives, may ordain that I shall end my days in exile; but neither my contemporaries nor posterity shall ever, even to my last breath, say, that in the hour of adversity I shewed myself unworthy of occupying the throne of my ancestors.

Through all his changes of circumstance, Louis retained his partiality for the classic writers, and especially so for Horace, of which there is a curious instance on record. When his *fidus Achates,* the Duc d'Avaray, was compelled by illness to quit Hartwell for the softer climate of Madeira, he

wrote from thence to his royal friend for some books, and among others, for a French translation of Horace. To this request, Louis, having in part complied, returned the following answer:—

Your commission about Horace was not so easy. There is a translation by the Abbé Desfontaines, but he got no farther than the middle of the third book of the Odes—so that would not suit you. I lately bought a translation by M. Daru—the *tribune* Daru—the *Count* Daru. It is in verse; here and there happily enough executed, but more frequently very poor, and sometimes it does not give the meaning at all; this, again, is not what you want. I have therefore fallen back on the old translation of Sanadon, which is on the whole the least imperfect. But I fear that the good father may have only translated the *opera expurgata.* That he should have omitted "Rogare longo puditam te sæculo," "Quid tibi vis, mulier nigris dignissima barris?" would be very right; these two odes are really disgusting, as well as some scattered lines in the Satires; but there are many delicious passages unnecessarily cut out, which I should be sorry that you should not have. I see but one remedy—send me the list of the odes you have, with their numbers, and the few first words, thus:—*L.* i. *Ode* 1. *Mæcenas atavis*, &c. I shall then see what you want, and will endeavour to supply the deficiency by an humble attempt of my own.

This royal version of the Venusian bard would indeed have been a welcome prize to any of our eager advertising publishers; but in all probability it was destroyed—perhaps never written. That numerous MSS. were consigned to destruction is a matter beyond doubt. Madame Gonet, an English lady married to one of the royal suite, expressly informed Dr. Lee's Secretary that, some time before the death of Louis, his eye-sight became very much impaired. He had a large quantity of papers in his bureau, some of which, he told Mons. Gonet, he would be glad to have left behind him, but that there were others which he did not wish to be seen by any person; and, as an inspection would be too laborious for himself to undertake with a view to select a portion, he ordered them all to be destroyed in his presence.

Though the letters from the King to the Duke were not published till some years after Lord Byron's death, yet he must have been aware of the royal *penchant;* for, after some scurrilous sneers, in his poem called "The Age of Bronze," he asks—

Good classic Louis! is it, canst thou say,
Desirable to be the "Desiré?"
Why wouldst thou leave calm Hartwell's green abode,
Apician table and *Horatian ode*,
To rule a people who will not be ruled,
And love much rather to be scourg'd than school'd?

The letters which the King addressed to the companion of his wanderings, though neither historically nor politically of much importance, exhibit the ease and serenity of a well-cultivated mind. But observation and strong sense appear every here and there with agreeable humour; as, for instance, when all the political quid-nuncs of Europe thought there was an irreconcileable quarrel between Napoleon and his brother Lucien:—

Hartwell, 9th October, 1810.—As there is, no doubt, a constant communication between Portugal and Madeira, you will hear the news of the Peninsula direct sooner than from England. You will perhaps also have heard of the arrival of Lucien at Malta. They represent him as having escaped, but he had 40 people in his suite. B.P. *(Buonaparte, thus uncialized in all the King's letters)* therefore could not have been ignorant of it; for at least his agents were not fools. What, then, can be the object of this movement? I cannot guess. All that I know is that I look upon M. Lucien as another Sinon. "But he had quarrelled," say they, "with his brother." Mighty fine! As if the quarrels of rogues who have the same interest ever lasted.

In the north, however, matters seem seriously perplexed, and nothing persuades me more of the probability of a war than B. P. publishing in the Moniteur that he never was on better terms with Russia. Poor Alexander! It is, indeed, high time he should look about him. I hardly allow him a year before he will be reduced to the same extremities as his unfortunate neighbour, of whom some one said the other day that he was no longer the King of Prussia, but the Prussian King.

The King seems to have had a great distrust of the Duke of Orleans, the late Louis Philippe, whose history forms one of the most remarkable and curious romances of real life on record. From an existing memorandum in the hand-writing of the late Duke of Buckingham, we learn the particulars of an interview which took place between them. "When Louis XVIII. was at Stowe, the Duke of Orleans, whom he had not admitted to his presence since the period of the Revolution, came to Stowe, and saw his uncle for the first time. My father and I were present at the meeting in the library. We two stood at the fire-place near the print-room. Louis and his nephew walked up and down the library, conversing some time. At length, just as they came opposite the table near the print-room door, we heard a clatter and a noise, and, turning round, I saw the Duke of Orleans on his knees before his uncle, seize his hand, and I heard him say,—'Ah! mon oncle, I ask pardon of my king, of God, and man, for ever having worn that accursed *(maudit)* national cockade.' Louis XVIII. raised him up, saying,—'*C'est bien, mon neveu; c'est bien: Je te pardonne.*' I can point to the very spot on the floor where this happened."* Soon afterwards, when this compound of sense and cunning—this politic democrat among princes and prince among democrats—wished to place himself at the head of the Spanish insurrection, his Majesty thus dwells on the upshot:—

Hartwell, 5th November, 1810.—The Duke of Orleans has been ordered off to Sicily by the Cortes; the motion was made in that monstrous assembly (monstrous I call it, because the annals of Spain can produce no instance of a Cortes in which there are but three grandees) on the 28th of September, and passed by a simple majority of five votes. The execution of the decree was confided to the Regency. A member apprised the Duke of what was going on, and advised him to present himself to the Cortes; he hastened

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* The Critic of Lucien Buonaparte's Memoirs *(Quarterly Review, vol. 57, page 395)*, states that the King saw into the recesses of the Duke's character:—"We know, from a person who has kindly communicated to us a note which he made of the conversation, that Louis XVIII. speaking of Louis Philippe to an illustrious foreigner, in the presence of his brother (Charles X.) said, that 'Egalite *était un meilleur homme que son fils*,'—an opinion which Charles warmly contested, and endeavoured to disprove by insisting on certain good points of Louis Philippe's character! *Eheu!*"

thither, gave them a dreadful fright, but was not admitted, and referred back to the executive power. On his return to his residence, he found waiting for him the Governor of Cadiz, who *politely kept him company* till he had actually put him on board ship.

Being at that moment at Cadiz, I happened to witness this politeness; and, seeing what the meaning of the embarcation was, I could not but look upon the guard turning out at the city-gate, and the roll of the drums, as sarcastic irony: and it was my lot afterwards to meet the Duchess of Orleans (the present Queen Dowager) at Minorca, where she was present at some private theatricals on board the Hibernia, of 110 guns, then bearing the flag of Sir Richard Keats, the admiral in command at Cadiz at the forced departure of the Duke. The above extract also shews that the heterogeneous composition of the Cortes had not escaped the notice of Louis; and his sagacity traced the absurdity of their principles and measures. This is further indicated in the following letter, and may account for his own conduct with regard to the Spanish revolution of 1823:—

Hartwell, 5th February, 1811.—They say (and as the report comes from both Paris and Cadiz I am afraid there may be some truth in it) that B.P. has a design for replacing Ferdinand on the throne of Spain, on condition of his marrying a sister of the unhappy Marie Louise. But, on the other hand, the Cortes have declared—at least so I read in a Cadiz Gazette—that "they would not recognize Ferdinand if he came under the protection of a tyrant, the usurper of the throne of Louis XVIII." So there they are standing up for the rights of a foreign sovereign, while they usurp the authority of their own. This inconsistency arises from the opinion which now seems to prevail of the sovereignty of the people, which has, it seems, a right to make what revolutions it pleases, provided they be not bloody. To what an extent does not this fatal doctrine reach? Would you believe, my friend, that the King of Sweden himself not only defends the conduct of his uncle towards him, but even professes to regard him as the legitimate sovereign?

The unfortunate King of Sweden, Gustavus IV. who sought refuge in England under the name of Count Gottorp, had opposed France with more spirit than power or military capacity: and, though he clearly made out that Napoleon was the Beast described in the Revelations, his means were too feeble for the encounter to which he considered himself called. Louis received and encouraged his visits to Hartwell with great kindness and attention; but he must very soon have perceived—from the reckless intemperance of his views—that the Swedes had been compelled to supersede him. However, he thus considerately mentions the last he saw of him:—

Hartwell, 13th of March, 1811.—The King of Sweden leaves this to-morrow before daylight, and England by the end of next week. He goes first to Heligoland—then to Anholt, to try to open some communication with Sweden as to his personal property, of which he has not for a long time received a penny. Thence to Russia, and thence he hopes to return into Switzerland. Poor Prince! I fear he has lost for ever that happiness of which he is really so deserving. It is not that he regrets the loss of his station; on the contrary, he talks of that with an indifference which one could not believe without having witnessed it as I have done. Quiet is what he professes to want, but surely whirling about the world is not the means of obtaining that object. Besides, though he has never made me an explicit confidence on that subject, it is easy to see that he has some domestic annoyances. I now had rather that he had not come to England.

At the time of writing this, the "Sage of Hartwell," as his followers designated Louis, had a gloomy horizon for his own affairs; for Napoleon, then in the very zenith of his fortunes, seemed to have established a dynasty for France in the birth of his heir-apparent, the *King of Rome.* The event, so portentously ominous to the Bourbon interests, was treated with a degree of philosophical resignation and sarcastic dryness by Louis, in these terms—"So then, we are to have a babe in the Napoleon family. Whether he is really the flesh and blood of the unhappy arch-duchess herself, or only an interloper smuggled into her bed-chamber, what care I? Many people look upon this event as highly important. I am not of that opinion, and here's my dilemma. If God has condemned us to this tyranny, B.P. can never want a successor; if, on the other hand, the divine wrath should pass away, all the babes in the world will not prevent the overthrow of the edifice of iniquity." In this expression of submission to destiny, there is an inference almost prophetic, and no small spice of contempt.

But among these letters there are none which prove the affectionate disposition of Louis more than those which describe the last illness of his wife, and his lamentation for her loss; and, as the following was written in confidence to his dearest friend, the tender anxiety with which he watched her last moments, and his feelings on her demise, must be considered as out-pourings of sincerity. The first is—

Hartwell, 2nd December, 1810.—I freely confess, that I was not aware I loved the Queen so much as I now find I did. Alas! I was so unjust as to think her illness partly imaginary; and my suspicion was grounded on the statement of Calignon, in whose judgment I reposed implicit confidence. The Queen complained that her ancles were swollen; Calignon said they were not; and I naturally relied on what he said, conceiving him to be the best judge of the matter. On Sunday the 4th of November, she told me that she wished to consult Lefebvre, whom I accordingly summoned. He waited on the Queen next morning, and at first expressed himself no less incredulous than I respecting the serious nature of her illness, but his opinion was changed before his departure. However, he did not let me know the whole of the melancholy truth. On the Tuesday, Lefebvre told me decidedly that dropsy was formed, and was accompanied by alarming symptoms. He, however, added, that he did not despair of reducing those symptoms; but, if he should not succeed, "all would soon be over." A fit of weakness and difficulty of breathing succeeded. The fit was not of long duration, but it returned at noon, and when it was over, she anticipated the proposal that was about to be made, of sending for her confessor. After confession, she signified a wish to take the sacrament, which was administered to her by the Archbishop; the venerable prelate, overpowered by his grief, was once or twice at fault in the ceremony of extreme unction; but the Queen set him right with a degree of coolness and presence of mind which she would certainly not have evinced had she been beside the death bed of another. She awoke dreadfully ill on Thursday the 8th; had a fit, though rather less severe than that of Wednesday. Some trifling symptoms of amendment appeared, and your poor friend was cheered by a faint glimmering of hope.

On Thursday we had a host of arrivals; my brother arrived from London; my nephews, who were on a visit to Lord Moira, at Donnington, arrived at nine in the evening; and the Prince and Princess of Condé at ten. The Duke de Bourbon, who was not in London, did not come till next day. The fit, when she awoke on Friday morning, was not so severe as usual, and throughout the day she was tolerably composed. The physicians had ordered that but few persons should be in the patient's room, and that they should not remain in it long. We accordingly passed the day in the drawing-room, visiting the bed-room by turns.

Madame de Narbonne was the only person who remained constantly with the Queen, and those who most frequently saw her were the Duke de Havre, the Archbishop, and the Abbé de Bréan. On the evening of Friday she wished the Abbé de Bréan to discourse with her on religious subjects, his talent for which is almost as great as that of the venerable Abbé Edgeworth.

On Saturday, the 10th, at 9 o'clock, the hour at which the fit usually came on, there were no symptoms of it. However, it commenced soon after; and I then saw how fully she was aware of her situation, and with what resignation she awaited her approaching end. A man named Motte, who was in the service of my brother, died in 1769, during a violent storm; and afterwards, the people about the Court, when speaking of very bad weather, used to say—*temps de la mort de Motte.* On the fatal Saturday to which I am now alluding, the rain poured and the wind blew more violently than I ever recollect in England. We were all speaking of it, when the Queen, interrupting us, observed, "You will not hereafter talk of the storm of La Motte's death." I made no reply; but the words made a deeper impression on my heart than on my ear. She now experienced a great difficulty of breathing in bed. She was placed in an arm-chair; and the fit increased to such a degree that the physicians were afraid that she could not hold out much longer. She inquired for the Abbé de Bréan, who had ventured to go to Aylesbury. Finding he was out of the way, she asked for the Archbishop; and, after conversing a few moments with him, she sent to inform us that she wished to see us all for the last time. We went to her, but she had not power to speak; and in a few moments she made signs for us to withdraw. Soon after, she desired the prayers for the dying to be said, which were commenced by the Archbishop (who, however, was scarcely able to articulate); and the Abbé de Bréan arrived in time to finish them. The Archbishop then gave her absolution, *in articulo mortis.* Meanwhile the fit abated, and her strength returned. She sent for me, and the Archbishop, in her name, asked me to pardon her for anything she had done to offend me. I replied, that it was for me to beg pardon of her. "No!" said she, "the Abbé de Bréan knows well that I have no cause to complain of you." Then, feeling her hand bathed in my tears, she said, in a gentle tone, "No more of this. I must now direct all my thoughts to my Creator, before whom I shall shortly be summoned, and with whom I will intercede for you." After I withdrew, she sent successively for my nephew and my niece, to whom she gave her blessing; the Duke de Berri, to whom she addressed some prudent and affectionate advice; and my brother, with whom she conversed in the same tone of kindness. After a short interval, the Abbé de Bréan came to inform me that the Queen begged I would go to my apartment. I obeyed, and you may imagine * * *

The anecdotes thus artlessly related by the King, are indicative of the serenity and presence of mind with which the good Queen quitted her sublunary station; and it was thought remarkable that her demise, like those of Cromwell and Napoleon, should have occurred while so boisterous a storm was raging. Louis sustained her loss with passive fortitude, thus showing a strong contrast to his brother Charles; who when the Fell Serjeant deprived him of a favourite mistress was plunged by his loss into inconsolable grief. To this occurrence might be ascribed the commencement of that change of mental frame of which his spiritual companions availed themselves, and by which they gradually transformed a character of levity into that of a devotee and a despot. The more sober but more touching feelings of Louis are excellently and pathetically shewn in this correspondence, with which he unbosomed himself. In a few weeks, he thus replies to d'Avaray's condolements—

Hartwell, 7th January, 1811.—Fear nothing for my health. It has not suffered. I am already at the point where I believe I shall remain: "no more tears, no more pangs of sorrow," but a sincere regret, a void

in my life which I feel a hundred times a-day. A thought occurs to me—sad, or gay, or indifferent—no matter, a recollection of something old, or an emotion at something new; I find myself saying, mechanically, "I must tell HER this," and then I recollect my loss, the illusion vanishes, and I say to myself, "the day of those soft intercourses is gone for ever." All this does not hinder my sleeping and eating, nor taking part in the conversation, nor even laughing when the occasion occurs; but the sad thought that she is gone "for ever" mixes itself with everything, and, like a drop of wormwood in food or drink, embitters the flavour without entirely destroying it.

And again: two months later—

Hartwell, 13th March, 1811.—My grief has lost its sharpness, but it does not wear off; any trifle awakens it afresh. A bit of paper, accidentally marked with two letters by which I used to designate HER, has this morning painfully reminded me that I shall do so no more. The other day the Duke of Havre, on coming into the room before dinner, followed by the Duchess of Serent, whom I did not see, stepped aside, as he used to do for HER in happier times. This accident created a momentary illusion, the recovery from which was painful: but still more painful, and which I feel as an additional calamity, is, that the time is come which must divide me even from her dear remains. Wishes, which I could not resist, oblige me to send them to the tomb of her ancestors in Savoy. The removal will take place on Tuesday. It cannot be helped—but I feel that I am again separated from her.

The Queen's remains were conveyed to a temporary resting-place in Westminster Abbey; and, as the war then raging prevented a free passage for transferring them to the mausoleum of her family, they were forwarded to the island of Sardinia to await an opportunity, where I afterwards saw the coffin in the splendid crypt of Cagliari Cathedral. Shortly after the departure of the corpse for London, the King wrote to his friend as follows—

Hartwell, 1st April, 1811.—You know how much I love spring, how delighted I have always been with the first fine days, the first leaves, the first flowers: the delight is not destroyed, but that "drop of wormwood" mixes itself with it. When I breathe this genial air, I say it would have done HER so much good. We have a white camelia here, which has never flowered so brilliantly as this year. Alas! it reminds me that I had bought it for HER on her birth-day. That birth-day has since revolved. I softened the grief it revived by prayers for the departed. But do not imagine that I would get rid of this "drop of wormwood," for that can only be by forgetting her.

It has been already mentioned that Louis the Eighteenth landed at Yarmouth, in October 1807; and it may now be added, that he was conveyed from the Swedish frigate Freya to the shore, in Admiral T. M. Russell's barge, under the title of Count de Lille. On his landing he was received by the Port Admiral, Billy Douglas; Admiral Essington; Captain Richard Curry of the Roebuck, of 44 guns, the port flag-ship; and Mr. Brooks, of the Alien-office, London. The companions of his exile were the Dukes de Berri, d'Augoulême, and Grammont; Counts d'Avaray and de Blacas (afterwards Dukes); Counts Etienne de Dumas, and Nautouillet; Chev. de Rivière, the Abbés Fleurieu and Cormur, and M. M. Perronet, Estelle, &c. &c.

A ministerial discussion which took place during this occurrence, may have contributed to confirm the rumour alluded to on page 375. The circumstance is thus detailed by Beauchamp, *Vie de Louis XVIII. p.* 429 :—

They even knew that his embarkation was fixed for an early day in November. Already the King of Sweden (Gustavus Adolphus) had placed the Swedish frigate, the Freya, at the disposal of the King of France.

Though the foreign journals had made known to the public the King's intention of going to England, the English Government had not yet received any official advice of it, but merely a communication through an indirect means. George the Third and his ministers showed themselves so desirous of testifying every respect to the illustrious exile, that an express was sent to Edinburgh immediately, with orders to make the necessary preparations for receiving Louis XVIII. in Holyrood Palace. At the same time messengers were sent with instructions from the Swedish Ambassador to the Captain of the Freya, to all the ports where it was thought possible that the King might touch: he was ordered to anchor at Leith, there to disembark his august traveller, who would receive every attention, and find people ready to receive him and conduct him to Holyrood.

When the Freya anchored in Yarmouth Roads, Louis XVIII. learning the residence which was destined for him, declined going there, and disembarking at Leith; it was not, he said, an asylum that he came to seek, he had a safe one in Russia, where he had left the Queen and Madame Royale his niece. The object of his voyage was of an entirely political nature, having only his interests as King of France for its object. The King added that he would rather return to Russia than go to Scotland, or be treated otherwise than as a sovereign who came to claim the aid of Great Britain.

But the English ministers were not at all disposed to support the King's just pretensions. "If the head of the Bourbon family," said they, "consents to live among us in a manner conformable to his actual situation, he will find a safe and honourable asylum here; but we know too well the necessity of the unanimous support of the English people in the war in which we are engaged to compromise in any degree the popularity which has till now accompanied the progress of the war; we should be compromising it by imprudently taking a part which would give that war a new character and would discourage the nation. Does the situation of France and the continent," added the ministers, "now present any more chance for the re-establishment of the Bourbons than at any other epoch of this revolutionary war which we have kept up for so many years. Has England any reason for thinking that she will now be better seconded by the rest of Europe than she has been hitherto? On the contrary, the almost entire submission of the continent sanctions, in a way, the existing order of things in France. Certainly the moment for abandoning a wise and clear-sighted policy would not be happily chosen.

In recognizing Louis XVIII. we should offer a fair opportunity to the enemies of the government to accuse us of introducing foreign interests into a war whose aspect hitherto has been wholly British."

Thus the King's arrival in England caused a lively sensation there, as much proceeding from the interest which the legitimate King of France inspired, as from the manner in which the ministers of George III. looked at his situation. It was much to be regretted that the illustrious exile should be received at the moment when he landed in a hospitable country by discussions on the motives which brought him there, and by interpretations far from consoling.

However, after the King's formal refusal to go to Leith and thence to Edinburgh, his landing at Yarmouth was not opposed in any way, and orders were given that he should be treated with all proper

respect. The Count d'Artois and the other princes came to receive the august head of their house on his arrival. The interview was touching. Monsieur immediately made the King acquainted with the political situation of England, and the disposition of the ministers with regard to him.

The King felt that the circumstances in which Europe was then placed no longer pointed to the same undertakings, or prescribed the same declarations. Instructed by misfortune, having with advantage studied men and governments in the different circumstances in which he had been placed, this prince knew that a cause which had gone through so many reverses, and which appeared desperate in the eyes of prejudiced or superficial observers, required the greatest delicacy of management; he was convinced that, while preserving the noble aspirations which were still bound up with it, it was necessary to avoid representing them coloured by an exclusive and suspicious exaggeration.

The party immediately assembled at the house of the Admiral's Secretary, which stood contiguous to the spot; and here the Count had an interesting interview with Monsieur the Count d'Artois. Private carriages having been promptly furnished, Louis and his suite were conveyed to the house of Admiral Douglas to breakfast, where the illustrious guests, to their apparent gratification, were joined by Admiral Russell, Sir Samuel Hood, and several captains of the North Sea fleet. After a pleasing repast, the party started from Yarmouth for Gosfield, the seat of the Marquess of Buckingham, where they were welcomed with a truly hospitable reception. Meantime a ludicrous incident occurred. The King, grateful for the attention of the barge's crew who rowed him ashore, left behind a purse of fifteen guineas for the tars to drink his health. On the matter being explained to them, not one of them would touch a farthing; but they immediately transmitted a very characteristic letter to Admiral Russell, expressive of their sentiments on the occasion. The following is a literal copy, and the original was read by Louis with peculiar glee:—

Majestic, 6 *day Nov.* 1807.

Please your Honour,

We holded a Talk about that there 15*l.* that was sent us, and hope no offence, your honour. We don't like to take it, because as how we knows fast enuff that it was the true King of France that went with your honour in the boat, and that he and our own noble King, God bless 'em both, and give every one his right, is good friends now; and besides that your honour gived a Order long ago, not to take no money from nobody, and we never did take none, and Mr. Leneve, that steared your honour and that there King, says he won't have no hand in it, and so does Andrew Young, the proper Coxen, and we hopes no offence, so we all one and all begs not to take it at all. So no more at present from you honour's dutiful servants,

And. Young, Coxen.	Thos. Simmers.
James Maun.	Thos. Kesane.
Lewis Bryan.	Simon Duft.
James Lord.	W. Fairclough.
James Hood.	John Churchill.
W. Edwards.	Tho. Lawrence.
Jan. Holshan.	Jacob Gabriel.
Tho. Laurie.	Wm. Muzzey.

For some time it remained unsettled as to where the royal family should pitch their tents, when at length an absurd report obtained, and has stubbornly maintained its ground in certain quarters, that the Marquess of Buckingham had kindly lent Hartwell House to the exiles. But neither the Marquess, nor any of his family, ever had any kind of possession of either the estate or the house, as may be seen in these pages: he was only the medium of hiring the premises from Sir George Lee. When Hartwell had been determined on as an appropriate residence for the strangers, the remainder of a lease of the mansion, granted by Sir William Lee some few years before to Sir William Young (see page 88), who had removed to the West Indies, was proposed to be conveyed to the Marquess of Buckingham and Louis the Eighteenth. But this not being acceded to on the part of Sir George Lee, who had then succeeded to the estate, it was subsequently let to the King at an annual rent of 500*l*.

In August 1808, the Queen, as Comtesse de Lille, arrived at Harwich from Russia, with a suite of seventy persons. These, as well as the King's party, together with their numerous attendants and servants, were all quartered on the Hartwell premises, where they were occasionally visited by the other French princes and emigrant nobles. The residents in the house and grounds generally amounted to about one hundred and forty in number; but they sometimes exceeded two hundred. So numerous a party required such extensive accommodation, that the halls, gallery, and larger apartments were ingeniously divided and subdivided into suites of rooms and closets,—in some instances to the great disorder and confusion of the mansion. Every outhouse, and each of the ornamental buildings in the park that could be rendered capable of decent shelter, were densely occupied; and it was curious to see how the second and third class stowed themselves away in the attics of the house, converting one room into several by an adaptation of light partitions, all of which were remaining at my first visit to Hartwell. On the ledges and in the bows of the roof, they formed gardens which were stocked with plants, shrubs, and flowers, in boxes containing mould to the depth of eighteen or twenty inches; and they moreover kept fowls and pigeons there, so that the superstructure was thus loaded with many extra tons of weight. But all was well-conducted and cheerful, throughout a residence of six or seven years; and in the evenings there was much mirth, music, and dancing kept up at the cottages around.

It must, however, be confessed, that in effecting the transformations alluded to, no deference seems to have been paid either to the feelings or the interests of the worthy proprietor of the mansion. Small windows were pierced through the walls, fixtures needlessly unfixed, and the ornamental balustrades of the parapet removed in those parts where they interfered with the Adonis gardens, or with the prospect. At page 108, the whole-length portrait of Lady Elizabeth Lee, the mother of their friendly landlord, painted by Sir Joshua Reynolds, is mentioned; and so little did there appear among the occupants either of respect for the arts, or of homage to the sex, as regarded this admirably-executed likeness of a beautiful female, that all the time the royal family occupied the house, a French mirror of extraordinary magnitude was placed before the picture, so as completely to exclude it from view. Sir George, who was in every respect one of the best of men, bore all these unpleasant incidents with amiable philosophy. When led to refer to them, some time after the departure of his tenants, he observed with a smile—"Well, still I ought to be satisfied with the remuneration which the British Government awarded."

Here King Louis led so retired a life, that little was known of him beyond the limits of the mansion. Whenever he met any person in the grounds, he always returned their salute by taking off his hat, and he would often hold a light conversation in tolerably good English: and to one gentleman he pointed out, with much pleasantry, that each side of the great door-way of Hartwell House bore a fleur-de-lis in the old carving, as if in anticipation of his coming. The style in which he lived was unostentatious, and very suitable to the rank he assumed of Count. His Majesty, family, and suite, about twenty-five in number, generally dined together in the large dining-room; and once in about three weeks, the inhabitants of the adjacent parts were allowed to walk round the table during the repast, entering at one door and retiring by another, in conformity with the custom of the old French Court. The regular drawing-room being occupied as an apartment for sleeping and sitting in, by the Prince and Princess de Condé on their visits, the library was used as its substitute, with the King's sofa raised on a little *dais*, or eminence, and here he used to see company and hold small levées; but his Majesty's own rooms were the study and its adjoining strong closet *(see Plate VI).* The Marquis de Généthous, contemplating this site in 1824, wrote—

Vrai Sage, soit qu'il perde ou porte la couronne,
Il fût pendant l'exil ce qu'il est sur le trône.

Madame Gonet, before-mentioned, stated that occasionally, when Louis was troubled with the gout, mass was celebrated in the dining-room, the altar being placed at the east end; and here occurred one of the gravest incidents in the eventful life of Louis. On Ladyday—25th March 1814—the royal family were at prayers, and Madame herself was seated near the middle window, which commands a view of the road leading from the lodge to the mansion. On a sudden she perceived two post-chaises, each drawn by four horses, rapidly approaching the house, with white flags displayed, a sight which provoked an exclamation from her in spite of the general solemnity of the room. The carriages contained certain Deputies from Bourdeaux, who brought intelligence that the Duc d'Angoulême had entered that city with Marshal Beresford's division of the English army, which had been received with enthusiasm; that the white cockade was displayed; and that Louis the Eighteenth was proclaimed.* Hardly was the excitement occasioned by these most joyous tidings moderated, ere Captain Slaughter, of the Royal Navy, conducted another party of Deputies to Hartwell, whom he had received off Dunkirk into the Archer sloop-of-war, charged to solicit the exile to return and take possession of his throne and kingdom. These gentlemen were ushered into the library, and the King signed the celebrated document said to have been suggested by the supple Talleyrand, stating that he accepted and would observe the Constitution of France.

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* Wellington thought the Duke was heaving ahead rather too fast, and that the citizens of Bourdeaux—who had made no exertions or sacrifice in the cause—were taking a lead to which they were not entitled. This feeling prompted those manly "wiggings" which appear in the inimitable volumes of his Dispatches: if Napoleon had lived to peruse these, he had perhaps been spared the everlasting disgrace of bequeathing a legacy to the miscreant who attempted to murder his noble opponent.

The Rev. Mr. King, who happened to be present at the ceremony, preserved the pen with which the signature was written, and has since placed it among the memorabilia in Dr. Lee's Museum, where it now remains.

The apartments for the accommodation of the Queen were those immediately over the library, and are notable for aspect, convenience, and command of view. Her Majesty died in the large room of this subdivision of the house, and was laid in state therein for several days, during which it was open to the public, when a large concourse of spectators was admitted. The apartment was next occupied by the ex-King of Sweden; and since—*longe intervallum*—by the writer of these pages during his frequent visits, to whom its vicinity to the library and the observatory recommended it.

The north-west angle of the same front of the building was occupied by Monsieur the Comte d'Artois, afterwards Charles the Tenth, whose character did not fully develope itself at Hartwell, although he, of all the party, was most accustomed to appear in public, by riding about the country. Somehow or other none of the Buckinghamshire gentlemen liked him, though, as in the noted case of Doctor Fell, it might be difficult to tell why: but this can hardly be thought singular, since he was never favourably spoken of with reference to his domestic relations. Unlike his brother the King, he was improvident in his habits, unprincipled in pecuniary matters, haughty in behaviour, perverse in disposition, and weak in intellectual stamina. It was impossible for such a man to gain popularity; nor did the signal *chute* of 1830 occasion surprise among those who knew him.

The room next to the chamber of the Comte d'Artois, and south of it, was assigned to the unfortunate Duc de Berri, who fell by the hand of an assassin in February 1820, while returning from the opera with his young wife. He was sensible, affable, and brave, qualities which greatly endeared him to those who were about him; and there were many circumstances in his chequered life which proved his goodness of heart. His tragical fate seems to have been greatly regretted in France, except by those who sighed for the extinction of the Bourbón race; and many of the Gallic visitors to Hartwell since the event, have deplored him in better feeling than poetry, as hath been seen in the lighter sheets of the periodical press. In 1822, a paper was found wafered over the fire-place of this room, on which are the following verses, by Count Marcellus, a Member of the French Chamber of Deputies—

Hartwell! nous conserva la Royale Famille
Qu'entourent nos respects, nos vœux, et notre amour.
Le Roi, cher à nos cœurs, son adorable fille,
Ensemble ont habité cet auguste séjour.
Combien pour les Français cet asyle a de charmes!
Il me rappelle aussi nos maux et nos allarmes.
Et je me sens frappé d'un cruel souvenir:
Ils étoient cinq hélas!—mais—essuyons nos larmes:
Nous en avons sept à chérir.

Another Parnassian visitor in 1828—Mons. St. Elme Petit—blesses the very walls:—

Salut aux Murs Sacrés, dont l'enceinte modeste
Renferma des Bourbons le plus auguste reste.

And a third, under the initials N. C. who afterwards arrived at Hartwell, thus expressed himself in poetical prose—

> Le 10 Mai, 1831. Je suis venu saluer l'asyle ou le Roi de France, le Père de la Patrie, méditait dans les douleurs d'un long exil—qu'il supportait si noblement—la prosperité, la gloire, la liberté du beau pays au quel il destinait la Charte Constitutionelle.

The handsome apartments at the south-west angle of this floor were inhabited by the Duc and Duchesse d'Angoulême and their principal attendants. The Duchess, as the suffering "Orphan of the Temple," and spirited "Daughter of France," was perhaps the most interesting personage among the band of exiles, and her early display of energy, penetrating understanding, and tender feeling for the misfortunes of others, were well remembered. But the brutal treatment and execution of her parents, and the other dreadful scenes of her tender years, had made so deep and lasting an impression on her mind as greatly to influence her manner and even stamp an habitual melancholy on her appearance,—insomuch that at times the sadness of her presence excited a painful sympathy. Yet this enduring princess was active and useful: she generally rose at five in the summer and six in the winter, walked hastily when in the grounds, and was averse to being noticed. Although a truly devoted Roman Catholic, she would occasionally look in at the parish church-door, sometimes with the Duke, during divine service; and she expressed to my late respected friend the Rev. Mr. Lockart, the officiating minister in Hartwell, her admiration of the decorous order observed in the Protestant forms of worship. Her piety did not escape the sarcasm of the Buonapartists after the Restoration, and in all their caricatures of the royal family which filled the print-shops of Paris after the departure for Lille, she was always, as if incapable of other occupation, represented on her knees before a prie-Dieu.* The frightful occasion, however, of the "hundred days" called forth an energy, and displayed a spirit, both royal and heroic; since she rose from her

* It was not the genuflections only of this princess which drew the gaze of the Parisians; for a main object of remark, on seeing the daughter of a murdered King return from a quarter of a century's exile, was the smallness of her bonnet and its *tournure Anglaise*. An incident of a similar kind had fallen under my own notice in the spring of the same year, 1814, when—being charged with an important communication for Murat's cabinet—I was one of the first Englishmen who for years had visited Naples in freedom. On this occasion I had the pleasure of accompanying the Duchess of Sangro and her two amiable daughters from Sicily, they having obtained permission to revisit their home; and on our moving about, the lively inhabitants, with every mark of gratification at our appearance among them, emitted audible tokens of surprise in their rich dialect at the "*Furastere cu cappillietti Ingresi*"—"*Han' a essere Furastere, cu sti miezz' cappiell*'," &c. worn by these Anglicised ladies. Fashion is despotic: on my return to Naples shortly afterwards, the tall cones surmounted with flowers had disappeared from the heads of all the females, and close English bonnets had replaced them.

knees, mounted her horse, harangued the soldiers, and acted in all respects with the courage and address of another Elizabeth.

On one of my earliest visits to Hartwell, her bed-room was allotted to me, and I generally slept in it until the observatory was commenced, when I removed to the Queen's apartment, and retained its occasional use for nearly twenty years. But it was impossible on first reposing in the d'Angoulême chamber, to suppress the tragic recollections of the modern Antigone and her times. Then arose homilies on governments, and whether the sciences which inform and enlighten, the arts which polish, and the morality and devotion which purify mankind, were most efficiently cultivated in monarchies or so-called republics: such reveries lasted—till the soft pensive strains of song, murmur'd the living lyre along—and in the morning, somehow or other, the subjoined doggrel lines were gathered—

And this is, then, the room where Louis' daughter
   A refuge found for six revolving years,
Here, 'scap'd those scenes of wickedness and slaughter,
   Which made the world, to her, a vale of tears.
And here that persecuted, suffering stranger
Reposed secure from treachery and danger.

Ah! hapless princess, though thy griefs suppressing,
   Thy care-worn features prove thy early sorrow:
Adversity is held to be a blessing
   Which numbers may with much advantage borrow—
And kings themselves, albeit by pomp surrounded,
Have oft-times felt the axiom truly founded:

But thy green years, and sex, were, ah! too tender,
   So deeply of the bitter cup to drink;
Nor can we marvel at the meek surrender
   Which made thy mind in gloomy sadness shrink—
Thou! whose deep sighs burst from a bosom tortured
For friends, for relatives, for parents slaughter'd.

Pale History sickens o'er the dismal page
   Which calls to memory that frantic hour,
When ruffian-hordes, inured to murd'rous rage,
   Ruled in the wantonness of lawless power;
And Anarchy in blood and rapine revell'd
Among the ruin'd shrines by fury levell'd.

Then through those halls, where chivalry of erst
   Was wont the pomp of monarchy to swell,
Loud shrieks of terror from the carnage burst,
   While the demoniac roar and frightful yell
Of drunken bacchanals—insanely driven
By glut of blood and pillage—startled Heaven.

Yet, while we execrate the rabble's madness,
And mourn humanity so vilely crush'd,
All must acknowledge, though th'assent's in sadness,
(A truth by history no longer hush'd)
That, though the *canaille's* doings were ferocious,
Thy grand-sire's deeds were scarcely less atrocious.

Yes! 'twas the son of Louis, styled victorious,
Who the sharp penury of his realms increased;
Louis the Vain! in war or peace inglorious,
In taste and passion less a man than beast.
A king who rent the ties of states asunder,
By lust, by sloth, by knavery, and plunder.

Need the muse dwell on gaming, gluttony, revels,
The vapid jest, the irreligious scoff,
The dire propensities, the monstrous evils,
Or obscene horrors of the *Parc-au-Cerf?*
Fain she would not—fain would forget vexations
Which made the throne of France the scorn of nations.

'Tis true, the monster gasp'd his dying breath
In ignominious safety on his bed,
While his successor met, from headsman, death,
To a sad scaffold by vile miscreants led:
The tyrant from a palace seeks his tomb—
The good man passes from his dungeon-room.

Yet still to all was shown the awful token,
How retribution waits the guilty course,
And that dread sentence to the prophet spoken
From the inscrutable mysterious source—
Now proved, though sin awhile maintains a station,
'Tis ever punish'd in its generation.

Having thus conducted the reader through the royal apartments, it will be needless to drag him through the rest; though an account of some of them in detail might prove amusing enough. To the curious in such matters I may mention that, though the light partitions and other "landmarks" of ingenious adaptation to circumstance have disappeared, Dr. Lee possesses a manuscript folio inscribed—"Hartwell House,—Inventaire des Meubles qui appartiennent au Roi, et à M^r le Ch^er Ley (Sir George Lee), 1809"—in which all the various apartments are numbered, and the names of their occupiers given; together with a statement of every article of furniture therein. But, though I thus pass the rooms, I subjoin a list of those occupiers of them who were, at one period or other, considered as permanent residents:—

The King and Queen of France.
Monsieur the Count d'Artois.
The Duke de Berri.
The Duke and Duchess d'Angoulême.
The Archbishop of Rheims.
The Duke de Grammont.
The Duke and Duchess de Serent.
The Duke de Havre.
The Duke de Blacas.
The Duke d'Avaray.
The Marquis de Vasse.
The Marquis Prideaux.
Count de Damas-crux and Countess.
Count Etienne de Damas and Countess.
Count Nantouillet.
Count de la Chapelle.
Countess de Narbonne.
Viscount d'Agoult and Lady.
Baron de Roverau and Lady.
Chev. de Rivière.
Chev. de Franval.
Chev. de Luckerque.
Chev. de Maleden.
Bishop Boullogne.
Abbé Godinot.
Abbé Fleurieu.
Abbé Cormur.
Abbé Bréan.
Dr. Colignon and wife.
Dr. Distel and wife.
Dr. le Febvre.
M. Perronet.
M. Huë and wife.
M. Clery.
M. Turgis.
M. Gouvernat and wife.
M. Gonet and wife.
M. André and wife.
M. Estelle.
M. Guigney and wife.
M. Didier and wife.
M. Lefre and wife.
M. Antoine.
M. Bauer.
M. le Maire.
Madame Préau.
Madame Armand.
Madme Pauline.
Madme Virginie.
Madme Adelaide.
&c. &c. &c.

Of these, the Comte de la Chapelle, Dr. Colignon—*medicus illustrissimus*, M. Bauer, M. Antoine, and two servants of the establishment, died during the occupation, and were allowed interment—free from the bigoted restrictions of Roman Catholic states—in the Hartwell-parish burial ground.

During the King's residence at Hartwell, it is reported that he received an allowance of 20,000*l.* a-year from the British Government: but a Buckinghamshire gentleman, who occasionally visited the royal exiles, states that the sum was divided, namely 14,000*l.* for his Majesty, and 6,000*l.* for the Duc d'Angoulême. In either case it was a liberal supply; and the tenantry of the neighbourhood were greatly benefited by the increased consumption of beef, mutton, poultry, butter, cream, milk, fruit, vegetables, and other specimens of the fat of the Vale of Aylesbury. Several of the old farmers have regretted to me their loss of this source of profit.

After the culmination of Napoleon's star, the prospects of the Bourbons revived; and upon the entry of the allied armies into France they became brilliant. It was soon seen that the tide had turned; and he who had for years remained almost unnoticed, the Sage of Hartwell, was now mobbed by visitors and pestered with addresses. His calm prudence however still prevailed, and he made his various arrangements and preparations for getting under weigh, as coolly as if only

about to shift his berth into another county. But all the lookers-on, both English and French, were excited to fever-heat the while. At length the Allies entered Paris, the Cossacks bivouacked in the Champs Elysées, Napoleon was black-balled, and Louis became *LE DESIRE!* On his consequent triumphant departure from Hartwell (April 20th 1814), in passing the town-hall of Aylesbury, he was greeted with the sight of the white flag waving on its summit; and a large concourse of people from all the adjacent parts made the air resound with hearty cheers. Many gentlemen of the local yeomanry cavalry escorted him along the London road to Stanmore, where he was met on the steps of the Abercorn Arms hôtel by the Prince Regent of England, and they shook hands most cheerfully. This salutation was highly exhilarating after the gloomy crisis which Europe had just surmounted: but for a Wordsworth perhaps it was less interesting than the contrast afforded by the interviews of Gustavus the Fourth and Louis at Hartwell, when the two ex-kings ranged the park together, and ministered condolence to each other.

The Prince Regent had arrived there at the head of an illustrious *cortége* to attend the solemn entry of Louis into London; and they left Stanmore with six royal carriages, besides the state-coach drawn by eight cream-coloured horses, in which were the King of France and the Prince Regent, preceded by one hundred gentlemen on horseback, and a numerous party of Horse Guards. The enthusiasm was general, and the rejoicings most cordial: about four miles from town the procession was met by a line of vehicles exhibiting splendour, fashion, and beauty, which preserved, even so far, an unbroken continuity to town. The villas on each side were decorated, scaffoldings raised, the Bourbon flags waving at every gable, and even the trees hung with the flag of the lilies. On arriving at Hyde Park Corner, a countless multitude awaited him, and nothing could exceed the cordiality with which the late exile was received into the British metropolis.

On the 23rd, at about eight in the morning, his Most Christian Majesty, the Duchesse d'Angoulême, the Prince de Condé, the Duc de Bourbon, and a splendid suite, accompanied by the Dukes of Kent and Sussex, left London for Dover, where every preparation had been made for their reception. The Prince Regent had already preceded thither to be in readiness to receive his Majesty, and to remain with him till his final departure from this country. The Duke of Clarence, as Admiral of the Fleet, hoisted the Union at the main on board the Jason frigate, to escort the Royal Sovereign yacht to the opposite coast, attended by a squadron of frigates and sloops-of-war. When the tide served, this memorable and triumphant escort weighed, and the Prince Regent, taking an earnest leave of the King, the Duchess, and the French princes, left them, and was landed at the pier-head.

As soon as the Prince Regent had quitted the yacht, the standard of England and the Admiralty flag, which had been flying, were struck; and the royal standard of France, surmounted by a British pendant, was hoisted at the main, under a salute of twenty-one guns from the castle, the batteries, and every ship of the squadron. The Royal Sovereign then stood out to sea, followed by the other yachts in which the nobles and suite were embarked; and as they passed the outer pier, the Prince Regent, who had taken a station at the very extremity, gave the signal for three British cheers, which was obeyed with ardent enthusiasm by the immense concourse of spectators of all classes who thronged every part of the shore. It would be difficult to describe the feelings to which so novel and impressive a scene gave birth.

Nothing could exceed the beauty of the weather and the admirable order of the squadron. On arriving off the French coast, the Royal Sovereign hove to, when the Duke of Clarence, in the Jason, passed her, fired a royal salute, gave three cheers, and bore away; and his example was followed by each of the men-of-war. In two hours and fifteen minutes from leaving Dover, the royal yacht entered the harbour of Calais, where a continued roar of cannon welcomed her arrival, and France received from the British navy the descendant of the Capets, Louis le Désiré, amidst universal enthusiasm; while loud acclamations of "Vive le Roi!" "Vivent les Bourbons!" "Vive Louis dix-huit!" and "Vivent les Anglais!" from that mutable people, rent the air.*

There was certainly a little matter to add *per contra*. Most of the English officers and visitors seemed surprised that no deputation to receive the King had arrived from Paris. A cause, however, was assigned for this; namely, that it was not exactly known where he would land, some supposing that it would be at Dunkirk, others at Boulogne. Some Buonapartist militaires evinced impatience, and seemed to view this extraordinary scene with a sullen aspect, as savouring too much of British management: and even some of the quasi-moderates thought Louis would have acted more politicly, if he had accepted of the French line-of-battle ship that was sent over from Cherbourg, to convey him back to France. These feelings, however, were in reality but as a cat's-paw on the surface of the ocean in a calm, scarcely making even an evanescent impression on the general joy and exultation.

Such was the wind-up of the deadly struggle between France and England, which had continued, with the exception of the hollow truce of Amiens, for twenty-one suffering years; and 1814 must ever be regarded as the era of a respite from the greatest evils with which the civilized world had been afflicted in modern times. It is true, the return of peace was at first more efficacious in reviving the spirits of the English, than in alleviating their burdens; but the unexampled final exertions of the coalesced powers, clapped a stopper upon a war expensive beyond all former precedent both in blood and treasure. The moderation of the conquerors was a pre-eminent feature, for, though Paris was at their feet, the integrity of the nation was granted; the foundation of the subverted system of European policy was laid afresh; and a King was restored, whose reign afforded France the only portion of tranquillity and rational liberty which she had enjoyed since

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* The good people of Calais expected that their newly-recovered King, and the British Admiral, would exhibit themselves at the theatre on the evening of their arrival, agreeably to a then very usual practice. They therefore resolved to have our national anthem sung, in its native tongue, and with a pointed compliment to the Royal Duke: "so that happy people," says my worthy friend S.R.M. *(Gloucesteriensis!)* "who can do everything in no time, forthwith prepared an additional verse,"—which they printed on the back of the play-bills. And here it is, as accurately as he can remember it—

God save noble Clarénce,
Who brings our King to France,
  God save Clarénce;
He maintains the glory'
Of the British navy',
Oh! God, make him happy',
  God save Clarénce!

the commencement of the Revolution,—or is likely to enjoy, till sense and principle shall guide her manufactory of constitutions. When the votaries of those jarring ingredients—military rule, espionage, universal equality, and the wildly visionary notions of property—are in council, a copy of Wordsworth's sonnet should be placed before them

> I grieved for Buonaparté, with a vain
> And an unthinking grief! for, who aspires
> To genuine greatness but from just desires,
> And knowledge such as *he* could never gain?
> 'Tis not in battles that from youth we train
> The governor who must be wise and good,
> And temper with the sternness of the brain
> Thoughts motherly, and meek as womanhood.
> Wisdom doth live with children on her knees:
> Books, leisure, perfect freedom, and the talk
> Man holds with week-day man in th' hourly walk
> Of the mind's business: these are the degrees
> By which true sway doth mount; this is the stalk
> True power doth grow on; and her rights are these.

A few words, and we have done with this eventful history. Writers have often to follow the hero of a tale of vicissitude into his retreat: here, on the contrary, the world finds him seated on the throne of a powerful kingdom.

When the royal family returned to France, various little actions shewed that they retained grateful and agreeable recollections of their late verdant retreat; as may have been remarked by those who were introduced to Louis the Eighteenth at Paris, or who visited the "Jardin à la Hartwell" at Versailles. In a letter written by the Duchesse d'Angoulême to a friend in Buckinghamshire, that princess says,—"Je n'oublierai jamais les témoignages d'attachement des habitans d'Ailesbury pour ma famille et moi pendant notre séjour parmi eux:" and most of the members of the suite expressed similar sentiments. Even the public caught the sentiment, and views and descriptions of "Le Château d'Hartwell" were published in abundance. On the 24th of August, 1816, a comedy was acted at the "Théâtre du Vaudeville" for the first time, which had a prosperous run: it was called, "La Rosière de Hartwell," and, while it complimented Louis, it represented some of the English under a caricature which gratified the flighty Parisians at that extraordinary moment: for the gaiters of the King, the little English bonnet worn by the duchess, and the *gaucheries* of some of our countrymen, consoled them for their capital being in possession of our army. The principal personages after the French in this comedy are a certain Milord and Miladi Splinn *(Spleen)*, Sir Scott, Miladi Scott, and a merchant's family. Sir Scott being the representative of British manners, is therefore a mighty drinker of Chambertin, Côte-Grillée, Chablis, vin d'Orage, and Champagne; and he enters exclaiming,—"*Godem! . . . n'arrêtez point moi.*" The main incident of the piece, and that which, in technical language, "brought down the house," was this:—"La scène se passe dans le Parc du Château de Hartwell. Deux charmilles ferment le fond du théâtre,

et laissent apercevoir le château." Towards the close of the drama, the two charmilles open, and disclose a small triumphal arch of verdure, bearing a bust of Louis the Eighteenth crowned with lilies, on the base of which is inscribed,—"AU SAGE DE HARTWELL." Delight is vociferously expressed, while a Monsieur Lefranc says,—

A son regard, à son air de clémence,
A la noblesse de ses traits,
A l'amour qu' inspire sa présence,
Reconnais le Roi des Français.*

Previously to crossing the threshold of Hartwell House for the last time, the King most kindly pressed Sir George Lee to visit him at the Tuileries; an invitation which the worthy Baronet did not avail himself of until some time afterwards. But on his arrival in Paris, having announced himself to the proper officer of the court and solicited a private audience of his Majesty, Sir George was desired to call the next day for an answer. The next day he called accordingly, but he found the officer unprepared with any reply for him, and he and his attendants hastily passing to and fro in confusion; which the Baronet considered to imply preparations for a fête, and became confounded also, being perplexed in his attempts to account for his awkward reception. It was not long, however, after his return to his hôtel that the occasion was sufficiently known. Tidings were arrived and spread that Buonaparte had escaped from Elba and landed in the south; and Sir George Lee was thus painfully frustrated in his design of congratulating the King on his accession to the throne of his ancestors: the poor monarch, in an infinitely more painful strain, was bustling to quit his palace at a moment's warning, and to flee for refuge to the frontiers. At such a crisis, and under the circumstances, perhaps a visitor from Hartwell had been the least acceptable witness of the transaction. On his return from Lille, Louis expressed great regret at this most *mal-à-propos* occurrence, and repeated his invitation; and in 1817, he sent Sir George his portrait, as mentioned on page 117.

Another English visitor was more fortunate. On his journeys to and from the metropolis, Louis had been in the habit of changing horses at the King's Arms inn, at Berkhampstead, the landlord of which had several daughters, with the eldest of whom, a very sensible young woman, he was fond of chatting, and became highly pleased with her sprightly freedom of manner. On the triumphant journey to London, she flew out to congratulate him on his restoration, an attention which he received with great pleasure, and good-humouredly invited her to visit him at Paris; whither she went a little before Sir George Lee's ill-timed call, and was provided with an apartment in the Tuileries. At her first interview with Louis, she took the liberty of asking whether "his Majesty did not feel himself more comfortable in the retirement of Hartwell than amidst the toilsome parade of the Parisian Court?" According to what Sir George heard, the reply of the King is stated to have been,—"Madam, I have always felt it my duty to make myself comfortable in every situation to which I am called." On this occasion Louis treated his fair guest with great

* This was before the Constitution-mongers had established the weighty difference between a King of France and a King of the French.

respect; but scandal and envy suggested to some Mrs. Grundy, that the monarch's attentions were dictated by a warmer motive than civility or friendship inspired. On the lady's return from France, when the calumnious report reached her ear, she addressed a letter to the Hertford newspaper, asseverating its falsity; and she pleasantly observed, that the only King's arms she was ever in, were the King's Arms at Berkhampstead.

In closing this account, it may be proper to state that, among other relics of the Bourbon residence preserved in Hartwell House, are the prie-Dieu chair of Louis the Eighteenth; the prie-Dieu of the Duchesse d'Angoulême, and her work-table; the altar in the chapel; Sir William Lee's chair converted into a confessional by the addition of a grating and kneeling-step; a fine missal which belonged to the Archbishop of Rheims; and a bronze reading-grade used in the chapel during divine service, the desk-plate of which is engraven with the sacred monogram over three nails in the centre of a radiated circle, with a cherubim at each angle of the plate. There are, moreover, various articles of furniture, and several portraits of members of the royal family, together with some books, manuscripts, and prints; and a clock, a barometer, and two or three thermometers which belonged to the King.

It is now high time to take leave of the Bourbons; and as to the balance of power—rights of legitimacy—indemnity for the past—security for the future—and other halcyon visions of our political quidnuncs, were they not attempted on a soil where neither true authority nor rational liberty appear to be capable of taking root! were they not cast to a class imbued with that—

——— immoralité
Qui joue avec les lois, les peuples, la science,
Comme avec l'or; qui joue avec la vérité
Au sort, après les dès jette sa conscience;
Aussi foible, aussi faux, qu'il paroit effronté.
Et qui, toujours joueur, n'a trouvé dans nos chartes
Qu'un moyen de jouer, et de brouiller les cartes!

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